the OIL AND GAS
JOURNAL
APRIL 28, 1958

## Those Crude-Price Cuts . . .

Journal study tells where, how much, and the volume of oil involved

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## What About the Upturn?

Oil men give views on when improvement will start, and how to be ready for it

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## The Swan Hills Region . . .

. . . a comer in North Central Alberta that looks like one of Canada's biggest

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A new record—

## 15,868 Ft. of 9⅝-In. Casing

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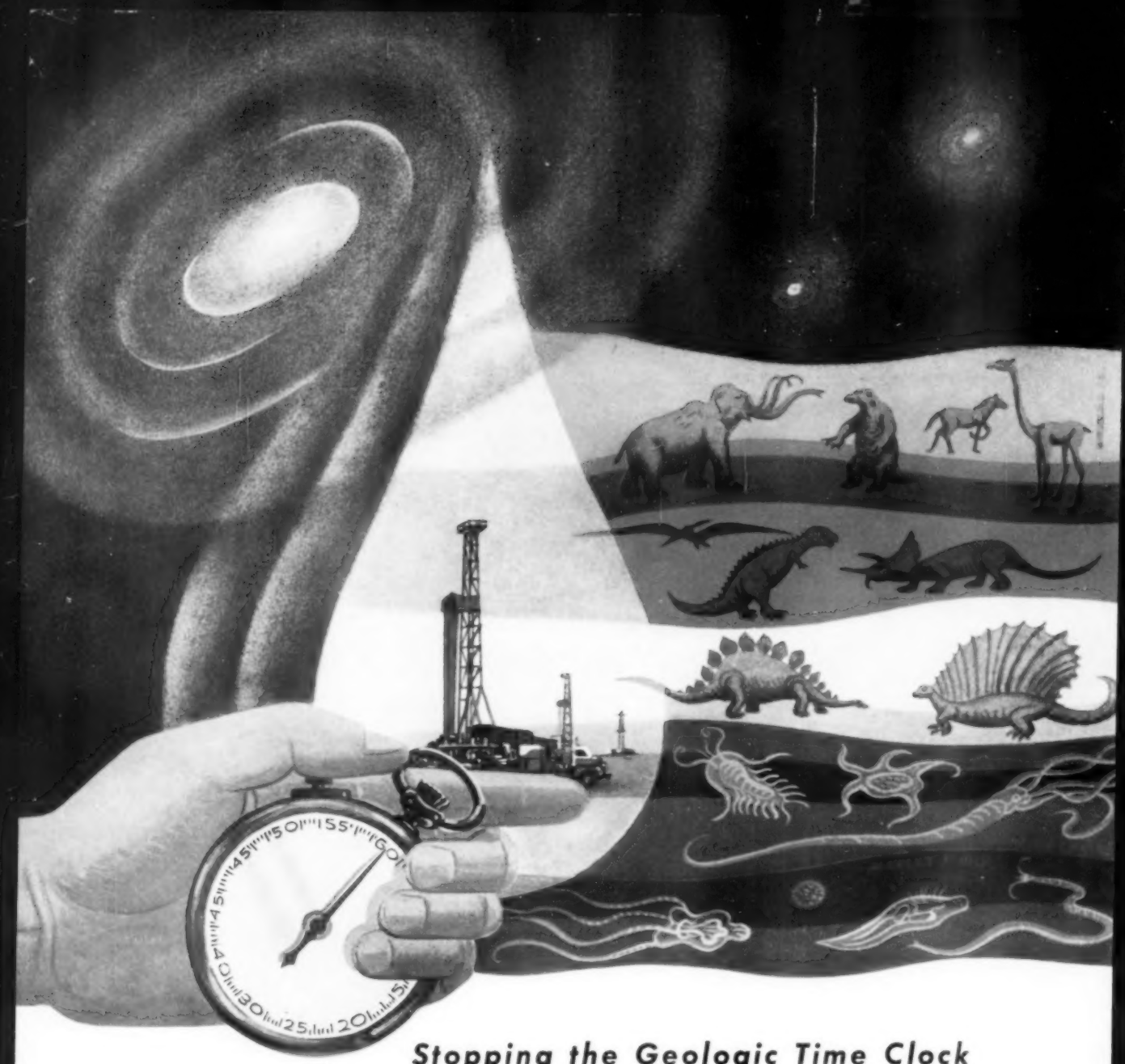

## *Stopping the Geologic Time Clock*

Each year the "crop" of oil is harvested, with no man-made technique for reseeding the depleted formations. Reserves must be maintained against the unabated demands, and man must continue to search and find the precious fluid in ever-increasing quantities to maintain civilization at its present high level.

We at Halliburton aid this search and protection of the very "fluid life" of our civilization through ever better means of producing aids and techniques. Stopping the geologic time clock causes man to probe deeper and further, both into the earth and toward the infinity of space.

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DUNCAN, OKLAHOMA

the OIL AND GAS JOURNAL Newsletter

Tulsa, Okla.
April 28, 1958

Price cuts since October have hit 29.1 per cent of output:

Volume of crude affected is 1,944,700 bbl. daily out of average production for the 6-month period of 6,690,000 bbl. daily.

Average price cut, weighted to reflect specific cuts on specific volumes, is 13.10 cents a barrel. The range is from 5 to 50 cents.

These statistics are the highlight of a Journal study of price cuts. It reveals for the first time just how extensive the reductions have been (p. 53).

Many crude buyers still think prices have stabilized. But scattered cuts are continuing. The latest:

...Kansas. Four refiners—Derby, N.C.R.A., C.R.A., and El Dorado—posted a 15-cent cut on 49,000 bbl daily. This follows a similar cut by Anderson-Prichard on 11,000 bbl.

...West Texas. Shell met competitive prices in West Texas with a 7-cent cut on 3,200 bbl. of Spraberry-type oil and 6-cent cut on 10,000 bbl. of intermediate sweet.

There's more optimistic talk about an upturn.

Oil men tell Journal editors they have a feeling that the bottom is near, better times will slowly follow (p. 56).

Here's what is happening:

Oil men are economizing everywhere they can.

Buying of supplies has been cut to the bone, and companies are living off inventories.

Drilling in most cases has been restricted to the must wells. Exploration work has been kept selective.

Result: When industry moves correct the supply-demand ratio, there will be a backlog of buying, drilling and exploration work to be done. This could give the factors working for an upturn a real kick.

When will real improvement come? Most oil executives and economists are making their plans on the basis of an upturn next year.

They see some improvements in the second half of 1958 but believe oil won't again prosper until general business also is out of the woods.

For oil men who fly light planes: A new automatic safety device keeps small craft flying in bad weather with only the basic instruments.

Langley Aeronautical Laboratory developed the aileron-trim control which levels the ship for indefinite period without retrimming.

Signs of the times: Oil conventions are being hard hit by company economy drives.

Fewer than 500 registered last week for the API session in Denver compared with 690 at Casper a year ago. Other API meetings this year have been off 20 to 30 per cent.

Reasons: Oil companies appear to be studying programs carefully, sending only those involved in committee work or those who will benefit particularly by papers to be given. Service companies also have cut their representation sharply. Firms which used to send 25 men now send 5.

The real hardship: Oil men at some meetings are being invited to buy their own drinks.

There's an explanation why the Rockies is enjoying a big drilling play, counter to most of the country.

A record number of farmouts is developing in Denver basin and North Dakota.

Denver basin leases taken during the big land play 10 years ago will soon expire if not drilled. Package farmouts covering 8 to 12 wells are being made.

In North Dakota millions of acres picked up at 10 cents per acre in the rush of 1949 also are nearing expiration. Price would jump to $10 and $15 an acre for much of this if leases were allowed to expire.

Result: Majors are eager to test, and independents are able to make excellent deals. Both areas should be unusually active throughout 1958.

What's the long pull for oil men in the Rockies?

Dallas Banker E. E. Monteith, Jr., gives this picture:

Oil men will be importing oil from other areas into the Rocky Mountain region by 1972.

Production in the 10-state area will peak at 960,000 bbl. daily in 1962-63, then decline.

Demand, in the meantime, will climb from 464,000 bbl. daily last year to 718,000 bbl. in 1967, meet oil production at 774,000 bbl. daily in 1972.

The Rocky Mountain area now is exporting 51 per cent of its oil, 20 per cent of its gas. The percentages, Monteith says, will gradually drop to zero within 15 years.

An important southeastern extension discovery is in the making for Oklahoma's deepest producing area, Knox field.

Gulf is calculating open-flow capacity of its 1 McKinney unit in Stephens County. Indications are the well will have

potential of 800 bbl. daily distillate with 20,000 M.c.f. of gas. Pay is from deep Ordovician perforations at 15,390-15,753 ft.

Successful completion will move Oklahoma's ultradeep production about 3 miles to the southeast. A half dozen active tests are now being made in this deep play.

Keen competition for offshore drilling jobs is beginning to have an effect on contract rates.

Recent contract for a 12,000-ft. well went at $12 a foot. Thus contractor will have to make more than 600 ft. of hole per day to match the $7,500 daily income commanded a year or so ago by a big drilling barge.

Even with increased drilling offshore, the trend may be toward lower footage rates. Some operators complained that day rates were unreasonably high when offshore rigs were scarce.

Efforts to perfect a sound-powered drill are continuing.

Its developers, however, have little to say about progress. During recent months the Borg-Warner sonic drill has been tried out in several California wells. Now it's being tested in a West Cat Canyon well where it has drilled below 4,350 ft. jointly with conventional rotary tools.

Drilling from California's first offshore platform will start by July 1 unless the unforeseen happens.

The caisson-type underwater portion of the platform is nearing completion at San Diego. A three-deck superstructure soon will be shipped from a Gulf Coast shipyard.

The two structures will be combined in 100 ft. of water at the 5,500-acre lease of California Standard and Humble offshore from Summerland.

Delhi-Taylor is seeking an interest in an Australian concession larger than the State of Texas.

The Dallas-based firm is negotiating for the rights with an Australian company. Oil interest is still keen in the Land Down Under. But high exploration costs—$78 million so far without a commercial discovery—are pinching local firms despite government aid on some wildcats.

Cuba's political situation has some oil operators jumpy.

Siboney-Caribbean Petroleum has temporarily shut down its drilling activities because of "unsettled political conditions," namely a revolution.

The company says it has deferred deepening its Cacique G No. 1 in Camaguey because of troubles in the province. The well had gas shows.

Transcontinental Gas Pipe Line is expanding into a new

activity—transporting gas its customers purchase from others.

Transco has been moving some gas on this basis for Sun, has now contracted to haul gas for three northern utilities. The FPC still has to certify these latter proposals.

The pipeline can make a profit moving the gas and does not have to worry about lining up gas contracts, about increasing field prices or possible rate cases.

Transco President Clyde McGraw thinks this type of service will grow among pipeliners. Gulf Interstate has similar arrangements and was expressly built to act as a pipeline "railroad" to move a customer's own gas.

New record price for Louisiana gas may be set through keen competition for huge reserves in Bastian Bay area of Plaquemines Parish.

Sale of 300,000 M.c.f. daily is being negotiated. Several major pipelines have been seeking the enormous reserves estimated at 2.4 trillion cubic feet or more.

Price exceeding record 23.9 cents per M.c.f. reportedly is being offered by at least one transmission company. The previous record was offered by Texas Eastern in Rayne field.

Producers, however, are looking for intrastate markets. Pan American holds about 60 per cent of the reserves. Other major operators in the field are Gulf and Tidewater.

Pipeliners say Trans-Canada will continue to lose money for a few years until it can develop the eastern Canadian market and start exporting gas to the U. S.

Net loss last year was $347,932. That made the accumulated deficit so far $664,808.

Submarine tankers aren't as far-fetched as you think.

Basic research already is under way with government aid looking into the design of submerged tankers.

Commercial submarines would have two advantages over surface tankers: Speed and reliability. They would not have to slow down in heavy weather.

Drillers could receive some benefits from this submarine research—ideas for a marine drilling device which would operate on the ocean floor.

Gordon Gray is slated to head new Office of Civilian Mobilization resulting from merger of civilian and industrial defense agencies. This puts two agencies dealing with oil under one roof.

First quarter earnings: Gulf—down to $60.6 million from $94.9 million same time last year...Texaco—down to $70 million from $86.4 million...Monterey—up to $758,245 from $720,402...Champlin—down to $1.3 million from $3.1 million... Wilcox—down to $189,402 from $253,838.

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the OIL AND GAS JOURNAL

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# TECHNOLOGY–OPERATION

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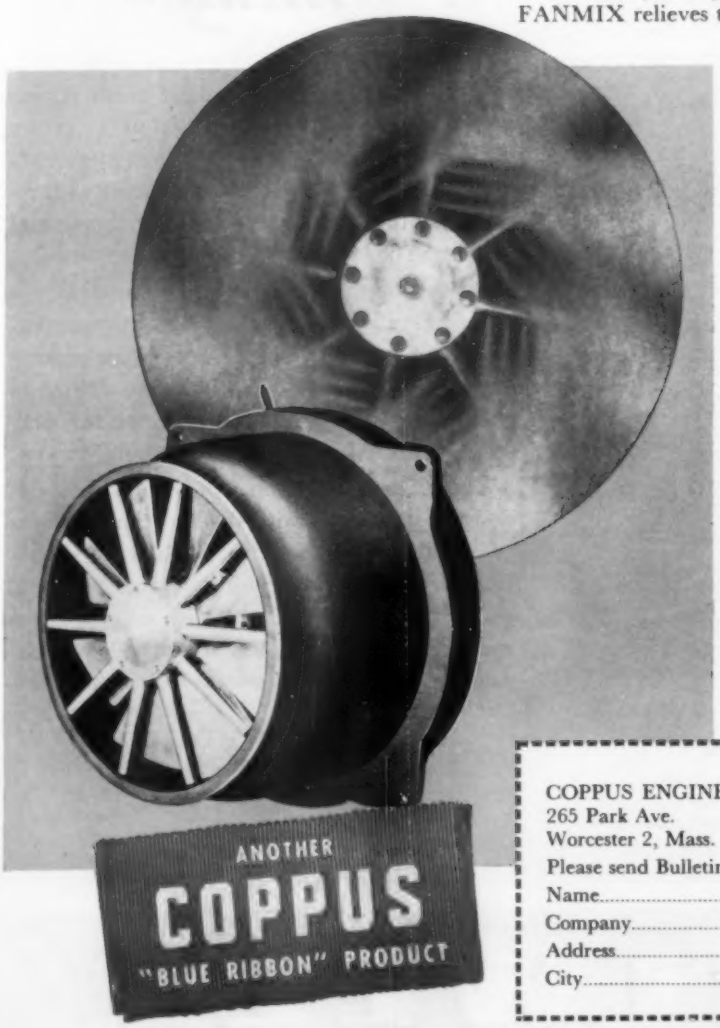


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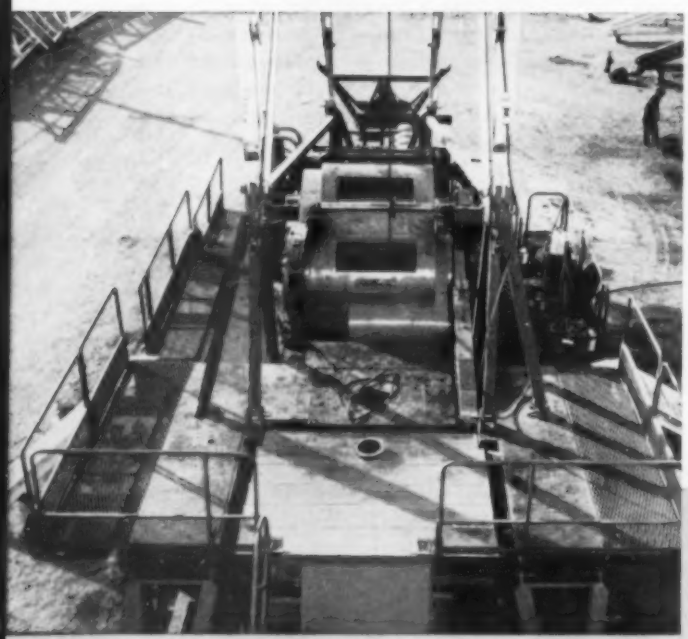

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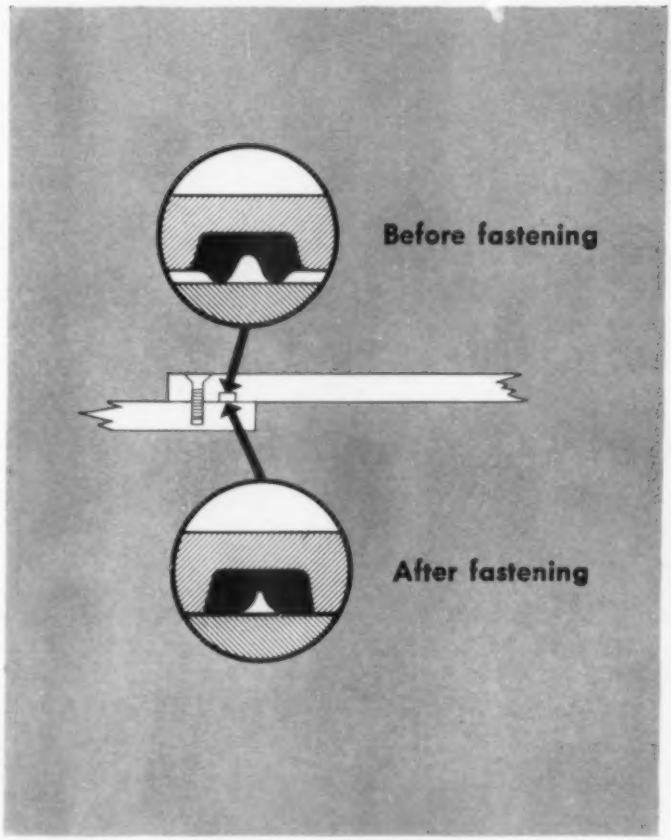


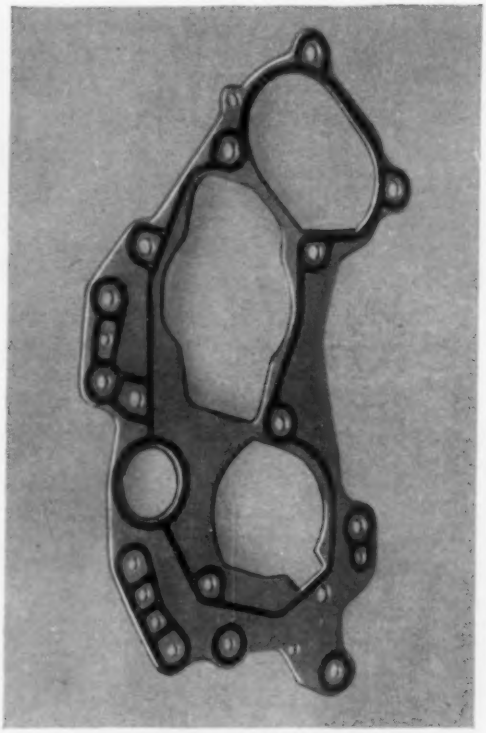

*Diagrams show functioning of Gask-O-Seal, manufactured by Parker Seal Co., a Division of Parker-Hannifin Corporation, Culver City, Calif. Photo shows flexibility of application to a wide variety of gasketing problems. B.F.Goodrich Chemical Company supplies the Hycar nitrile rubber materials.*

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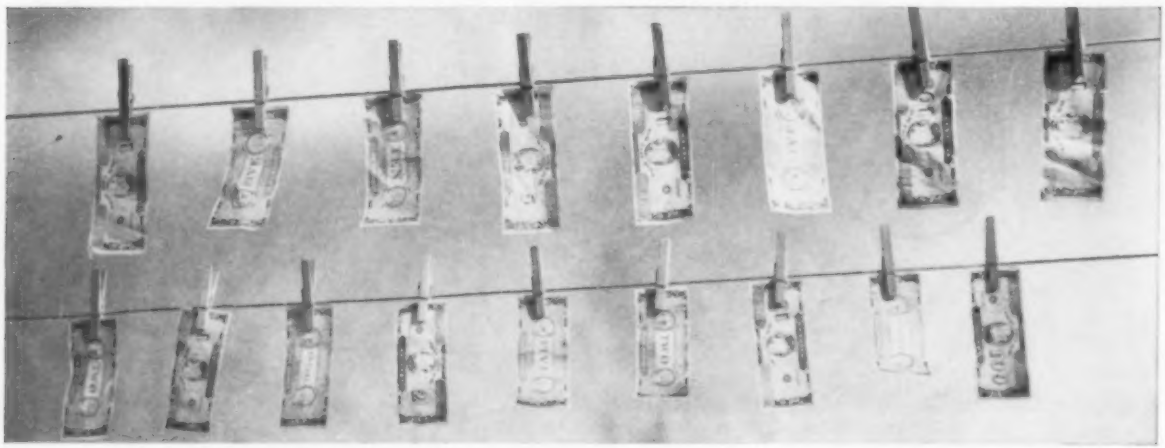

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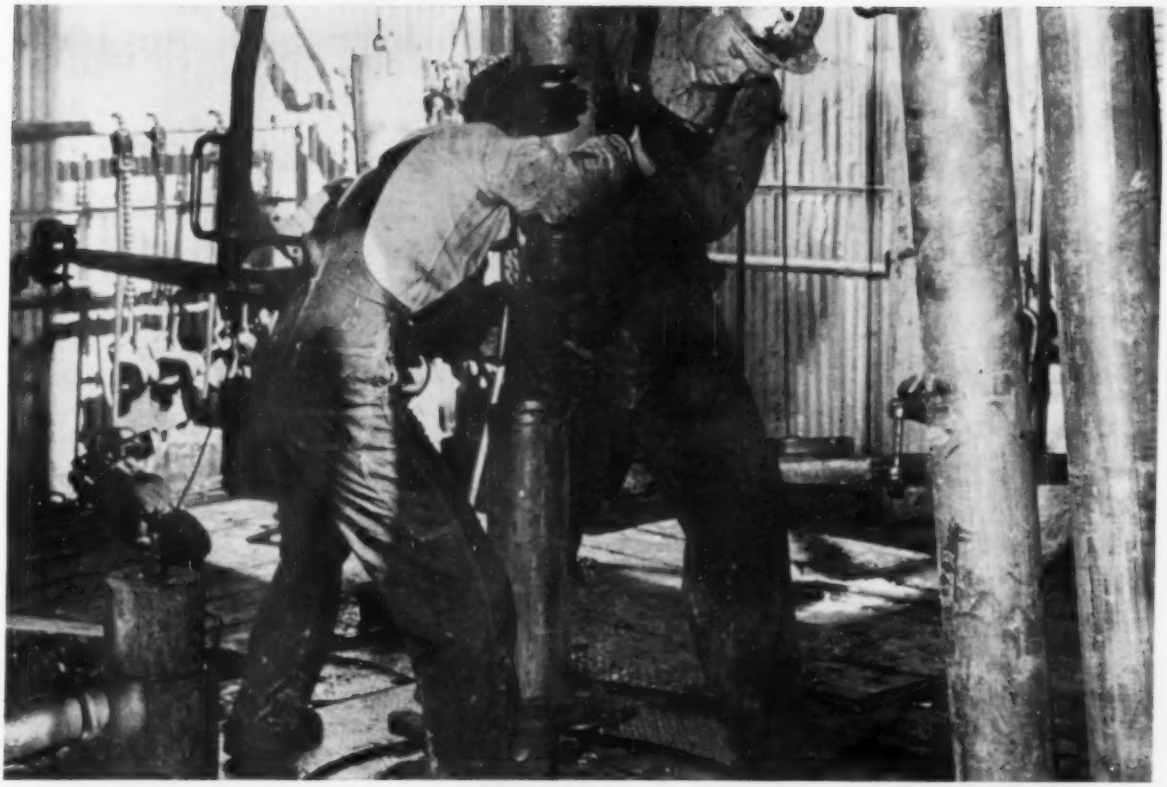

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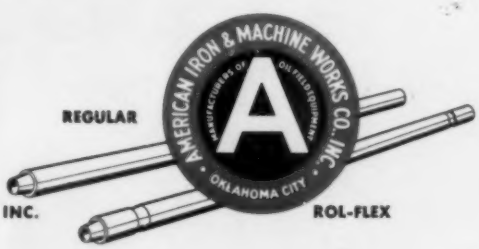
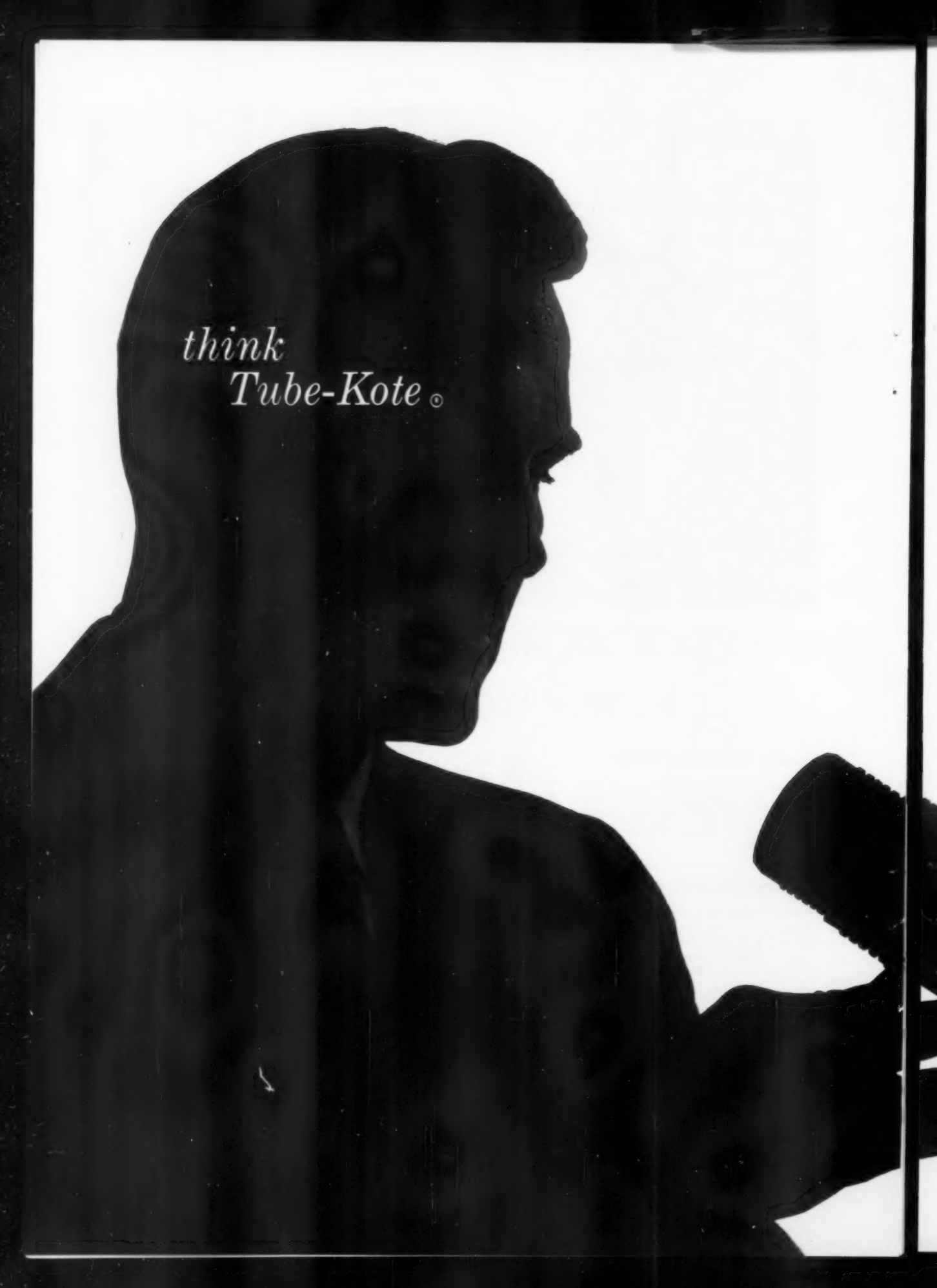
To get more footage drilled with less drill collar trouble—specify American Iron Premium Steel Drill Collars!

*AVAILABLE THROUGH YOUR LOCAL SUPPLY STORE*




Another AMF Product
PETROLEUM EQUIPMENT

**AMERICAN IRON & MACHINE WORKS COMPANY, INC.**
518 North Indiana Avenue • Oklahoma City, Oklahoma
Subsidiary of AMERICAN MACHINE & FOUNDRY COMPANY


think
Tube-Kote ®

Tube-Kote coatings also are used to prevent paraffin accumulation and to protect tanks and vessels from all types of corrosive deterioration.

Tube-Kote research is available to you in solving your specific corrosion problems . . . to increase your company profits by decreasing operating costs.

## SUPERIOR COATINGS TO STOP CORROSION

The acceptance of plastic coatings to protect oil field tubular goods from corrosion is widespread in the oil industry. Likewise, Tube-Kote is accepted as the pioneer of every major improvement in plastic coatings since 1939. Through research, Tube-Kote has developed many coatings . . . each with special properties needed to solve unique corrosion problems . . . each developed to rigid specifications before marketing. Think Tube-Kote when you need pipe coatings.

# TUBE-KOTE®

P. O. BOX 20037 • HOUSTON 25, TEXAS BRANCH PLANT • HARVEY, LOUISIANA

EXPORT REPRESENTATIVES: LUCEY EXPORT CORP. 223 BROADWAY NEW YORK 7, N.Y.

*Tube-Kote research and superior methods bring you more durable coatings and faster service . . . at lower cost!*

## TIME...
## EXPENSIVE RIG TIME...
## CAN BE SAVED
## WITH HALLIBURTON
## DUMP BAILER SERVICE

Halliburton Dump Bailer Service is designed to furnish the necessary tools and materials for effective remedial oil well service with a minimum of delay and a resulting saving of costly rig time. Plug back jobs, bridge plugs below damaged pipe, shot tamps, water shut off, seal for bridge plugs—these and other remedial applications are performed by this specialized Halliburton service to save you money, time and trouble.

The bailers used to give you this better service are special light aluminum alloy sections which when run on sand line can place four sacks of cement or 36 gallons of other slurries at one run. If more material placement is needed and drilling line is available, it is possible to place up to ten sacks of cement or 60 gallons of other slurries at one run on special order. With special equipment using the same type bailer, Braden Head squeeze jobs can be successfully completed. The full opening bailer bottom allows materials to be discharged in a body, preventing contamination. With these Halliburton advances, more dependable and economical service can be provided than with the old method of trying to make a plug with only one or two sacks at a time.

For fast and skillful service on your remedial cementing needs, call on Halliburton Dump Bailer Service. You'll find that expensive down time can be kept to an absolute minimum.

**HALLIBURTON**

OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA

# THESE EFFECTIVE HALLIBURTON TIME-SAVERS HELP TO REDUCE COSTLY RIG EXPENSE:

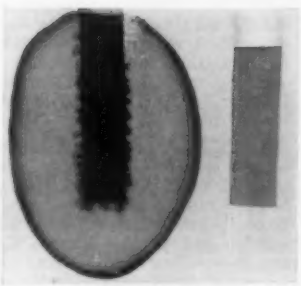
Hydromite

***Hydromite*** is a waterproof plastic cement, composed of a special gypsum cement and a powdered resin, especially adapted for dump bailer service. The setting time can be controlled to very close limits and the initial set takes place in from 75 to 100 minutes. It will set in temperatures ranging from 60° to 180°F. Within ten or fifteen minutes after the initial set, Hydromite has a compressive strength of approximately 1,500 psi which permits further dumping of material in the well. Full strength (approximately 4,000 psi) is obtained in from three to twenty hours, depending upon the well temperature.

"DB" Bridging Basket

***"DB" Bridging Basket*** is an efficient umbrella type that will bridge holes from 4½" to 15" I.D. in casing or open hole. The drillable basket has been used successfully on hundreds of dump bailer jobs and has shown its efficiency in wells exceeding 13,000 feet in depth. The "DB" Bridging Basket as shown in open position, forms a dumping bridge for additional materials and saves time in isolating formations, locating and repairing casing leaks, squeezing, acidizing and other operations.

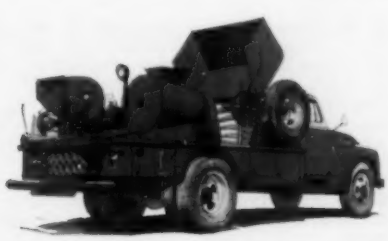
*Halliburton's Cal-Seal* is a quick-setting, super-strength gypsum cement most popular for Dump Bailer jobs . . . bridge plugs, split pipe, blowouts, shot tamps. It expands 0.3% (linear) during setting, which tightens plug in hole or fissure. Available in three types for controlled set . . . 30 to 60 minutes after mixed . . . for temperatures up to 170°F. Cal-Seal develops a compressive strength of 2500 psi one hour after setting. The set product is readily drillable, low in permeability, easily applied and economical. Cal-Seal is often effective for sealing off open formations to reduce loss of circulation . . . sets as it moves.



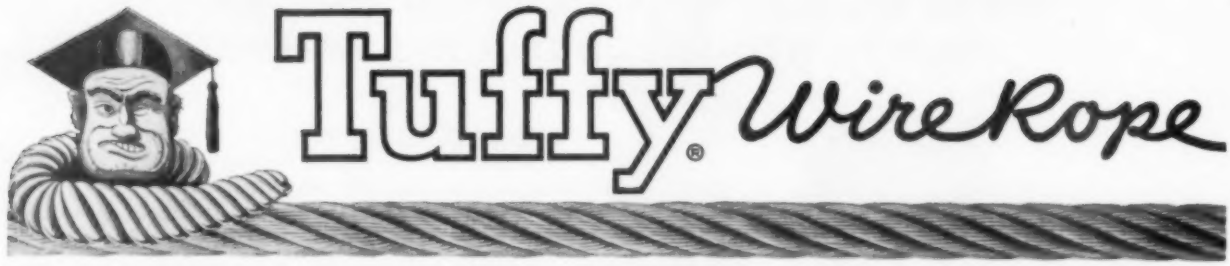
Resin-Cement

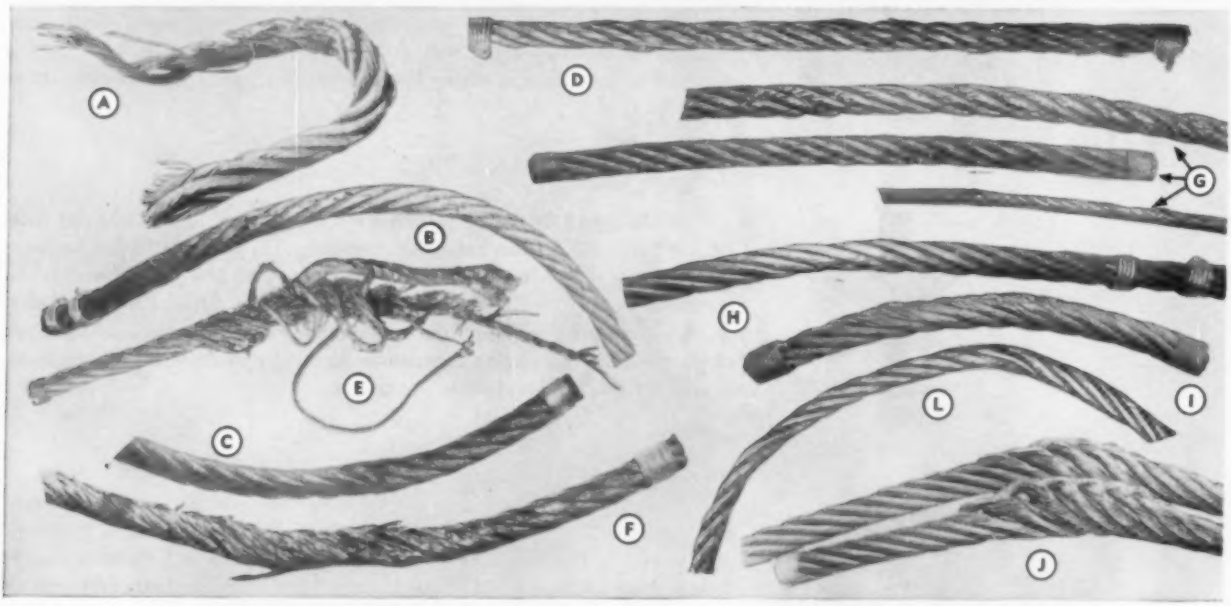
***Resin-Cement*** is a slurry composed of portland, high-early or retarded cement, water and thermo-setting resins, suitable for application in wells with temperatures ranging from 80° to 230°F. It is designed for open bottom hole plugs, setting around casing shoe or opposite water zones, and other remedial work on oil or gas wells, particularly where ordinary cementing materials fail. The set Resin-Cement is permanent in nature, is not subject to attack by oil, gas or salt water, and will resist the action of common acids. With these qualities, any proven plug or shut-off should be permanent and impermeable.

## DUMP BAILER SERVICE



"AROUND THE CLOCK—AROUND THE WORLD"




## Guard Against these Cripplers and Killers of Wire Rope

**Pictured above** are some of the results of wire rope abuses. They quickly ruin wire rope efficiency or end rope life abruptly, long before you have had the service you paid for. Even the best wire rope is a sitting duck for these enemies. When you avoid or minimize them, you make real gains in longer rope life, better service and greater economy. Remember, your Tuffy distributor will be glad to work with you against these and other wire rope hazards.

**Here are** the "case histories" of the untimely wire-rope fatalities and injuries shown in the picture:

**A. Mangled in a wedge socket:** Here's a result of improper socketing. It was caused by using a poorly designed or worn-out wedge socket. Failure at the dead end can damage other sections of the rope, too.

**B. Rusty road to ruin:** Rust—No. 1 enemy of steel—takes a heavy toll in wire rope life. An insidious, silent type of killer, rust often does irreparable damage before it's even noticed. The one-strand break shown here resulted when the rope was allowed to become rustbound through lack of lubrication. Tests show that, with other conditions ideal, properly lubricated rope has up to 10 times the life expectancy of dry rope.

**C. The crushing blow:** The Sunday punch for this piece of wire rope was delivered by a tractor cleat—just one of many crushing injuries caused by rope being run over or banged into by hard, sharp objects. Even the toughest wire rope is no match for this kind of mistreatment.

**D. Strangled by a misfit:** When the bearing surface of a sheave is too small for the rope diameter, pinching action quickly destroys the rope — especially when it's overloaded. The victim shown here was knocked out in just 1½ hours of service.

**E. Apparent suicide:** This rope jumped out of sheave and was soon destroyed by pulling around the shaft. Actually it was a case of sudden slack which threw the rope out of the sheave.

**F. End of the line** came quickly for this rope as the result of operating over a sheave that did not turn. Note the exceptionally heavy abrasion on one side of the rope. Sheaves should be checked thoroughly and often.

**G. Victim of the "bends":** Excessive bending of wire rope accelerates wear. Generally, more flexible ropes are used as bending stresses increase (with decrease in tread diameter of sheave or drum). If a rope is operated on a sheave too small for its bending characteristics, early failure is certain. Through an exhaustive series of bending tests, Union Wire Rope engineers have compiled data that you can use to assure getting the rope construction that will give you the longest service life. Ask about it.

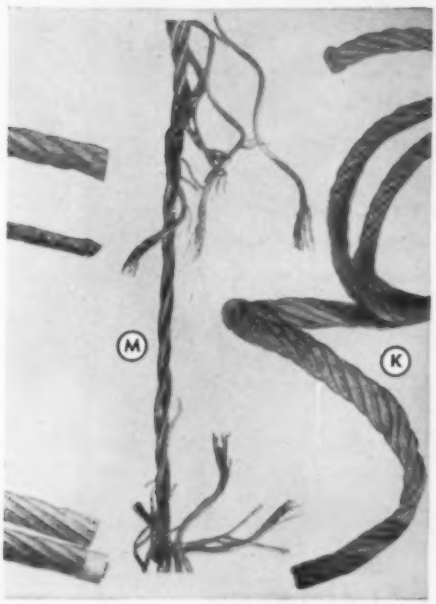
**H. On the "blink" from a kink:** This open kink resulted from mishandling of rope. Guard against kinks by proper winding on the drum. Never pull a loop smaller. Always enlarge it, then straighten out the rope.

**I.-L. Crushed and worn from "beatings on the drum":** Even under normal operating conditions, drum wear gives wire rope severe punishment. This wear concentrates at the cross-over points and at the flange. Excessive drum crushing results from operating on small drums, excessive loading and poor winding. Smooth drums are not recommended. Here are typical "drum beatings":

**I. Cross-over wear.**
**J. Cross-over crushing on drum.**
**K. Drum crushing from poor winding.**
**L. Drum-crushing from small drum.**

Although drum wear cannot be eliminated, its effects can be greatly reduced. Under properly engineered procedures, two and three times the service can be obtained from the same line by improving drum conditions. Union Wire Rope engineers will help you with this problem. Get in touch with us for more information. 58-1

# Tips




**M. Overloaded — soon exploded:** The rated capacity of a wire rope is based on the breaking strength (catalog) divided by a safety factor applicable to the type of service or use. The grade of steel, type of construction and size of the rope determine tensile strength. It must be properly related to the loads it will carry, or costly and dangerous early failures are likely to occur.

## How Your Tuffy Distributor Can Help You Save Money

Condition of equipment is a big factor in longer rope life and greater economy. Your Tuffy distributor will help you check your equipment and operating conditions to make sure everything is in your favor for getting greatest service from your wire rope. Get in touch with him. And ask him to put your name on his mailing list for FREE Tuffy Educational Bulletins.


Be Sure You Use

BALANCED Wire Rope

You hear a lot about extra strength in wire rope. There is no trick to designing wire rope with very high strength. But — there is nothing to be gained if high strength is put in to the exclusion or subordination of other qualities that are just as important as excessive strength.

For example: the life of a dragline depends on its resistance to abrasion. When it breaks, as a result of continued exceptionally hard digging in abrasive materials, the owner finds maintenance cost of the dragline increasing. Hard-drawn rope tends to act as a spring. As wear progresses, it arches over the crown of the strand. Repeated flexing of this too-strong arched wire causes early failure. So the drag rope must meet a condition where strength is not the major factor in resisting abrasion.

Every one of the Tuffy Special Purpose Ropes has a different ratio of strength to other properties necessary for longest life, most efficient operation and lowest maintenance expense. Your Union Wire Rope distributor has the BALANCED rope for every application.

**Tuffy Special-Purpose Ropes are tailored & BALANCED for special uses**

**Tuffy** BALANCED Rotary Lines

**JACKKNIFE Rotary Line.** Combines proper balance of extra strength and extra flexibility. Spools easily on small sheaves and drums of jackknife rigs drilling to 6000 ft.

**STANDARD Rotary Line.** For top performance in drilling use with standard rigs in any formation. Also a star performer in deep drilling beyond 6000 ft. with jackknife rigs.

**Tuffy** BALANCED Slings and Hoist Lines

This team has made a name for cutting hoisting and downtime costs in all types of materials handling: Tuffy Hoist Line, the longer running rope, and Tuffy Slings, made of an extra flexible machine-braided fabric that smooths out uninjured after knotting or kinking.

*Easy to order! Just say* **Tuffy** *... give length and size! No complex specifications.*

union Wire Rope corp.

SUBSIDIARY USS STEEL CORPORATION

2102 Manchester Ave. Kansas City 26, Mo.

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

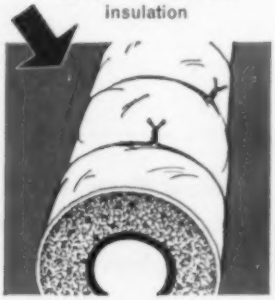
# Now! One-pipe steam-traced systems with new Reynolds Aluminum Duplex Pipe with steam line built-in.

**THIS ELIMINATES**

**THESE UNNECESSARY COSTS:**

...the cost of steam jacketing and extra pipe

...the cost of excessive insulation



Now a complete steam-traced system can be installed in one pipe: Reynolds new Aluminum Duplex Pipe.

This tough, lightweight pipe has a *built-in* steam line . . . it eliminates the need for steam jacketing . . . it eliminates outside steam-trace lines . . . it permits use of standard insulation . . . it's a complete steam-trace system in one pipe.

Installation is fast and simple, too, with Reynolds Duplex Pipe. It's lightweight and easy to handle, join and weld, and can be formed readily with ordinary hydraulic pipe bending equipment.

The new Reynolds Duplex Pipe can improve heating efficiency, and reduce the need for insulation. Aluminum has high thermal conductivity, low emissivity. This means better heat transfer within the Duplex Pipe, less heat lost, less insulation needed.

And, like the Reynolds Aluminum Process Pipe that is handling the roughest jobs in the chemical processing and petroleum industry, the new Duplex Pipe stands up against corrosion.

Reynolds Duplex Pipe is available in four sizes —1½", 2", 3" and 4"—and in alloys 3003-F, and 6063-T5.

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

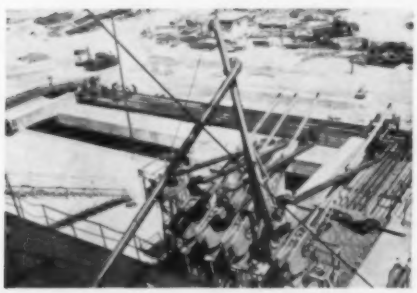
*Get full information on Reynolds Duplex Pipe*

**FREE BROCHURE**

Write today for a free brochure on Reynolds Aluminum Duplex Pipe, for details on joining, sizes, alloys and pressure ratings. *Reynolds Metals Company, P.O. Box 1800- CR, Louisville 1, Kentucky; International Division, 19 East 47th Street, New York 17, New York.*

*Watch Reynolds All-Family Television Program, "DISNEYLAND", ABC-TV.*

# RICHFIELD INSTALLS NUMBER FOUR



Where once seven men labored 30 minutes to hook up rubber hose, now one man operating hydraulic controls swings a Chiksan Loading Arm aboard, ready for hook up, in less than a minute. There are 96 Chiksan Marine Loading Arms in service throughout the world. Many more are on order.

## Richfield, like other users who are reordering, has installed still another bank of Chiksan Marine Loading Arms.

The first bank of Chiksan Marine Loading Arms on the West Coast went into service at Richfield's Terminal No. 2 in May, 1956. Subsequently, two additional banks of five were installed to render the facility among the most modern anywhere. This terminal has since handled over 50 million barrels of crude and refined products of many grades. Now, with growing need for greater transfer capacity, Richfield has ordered and installed an additional bank of three arms.

On every count, Safety, Economy, Speed, the Chiksan Marine Loading Arm measures up. So substantial are the savings gained from faster loading, greatly reduced replacement costs, fewer loss-time injuries, and elimination of rupture potential, that in many cases these savings can easily amount to the actual purchase price within three years.

Send for informative bulletin and payout analysis today.

fmc

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

CHIKSAN

CHIKSAN COMPANY—BREA, CALIFORNIA • CHICAGO 5, ILLINOIS • NEWARK 2, NEW JERSEY

Well Equipment Mfg. Corp. (Division), Houston 1, Texas • Subsidiaries: Chiksan Export Company • Chiksan of Canada, Ltd.

#58-33

# LIBERTY MUTUAL

The Company that stands by you

## ANNOUNCES NEW

# 4-WAY INSURANCE PROTECTION PLAN

## FOR OIL WELL DRILLERS

World's largest writer of Compensation Insurance announces insurance package that can lower your costs, let you consolidate your portfolio into one *tailor-made* program that protects you these four ways . . .

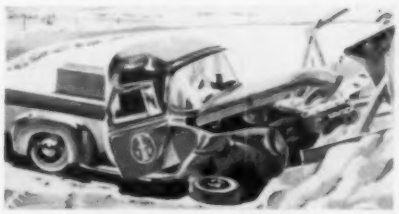
LIBERTY MUTUAL INSURANCE COMPANY • LIBERTY MUTUAL FIRE INSURANCE COMPANY • HOME OFFICE: BOSTON

## 1 Liberty protects your rig

against fire, wind, explosion, blow-out, collapse, cratering, pull-in, loading, skidding, and many other disasters. Liberty's new rig policy gives you realistic coverage when and where you need it.

## 2 Liberty protects your men

Top loss prevention engineers from Liberty Mutual work in the field with you to help keep your men safe. When accidents happen, Liberty claimsmen and Liberty medical specialists work to help speed recovery. What better way to reduce losses and save money!



## 3 Liberty protects your fleet

Your fleet coverage, like all other parts of this across-the-board program, is tailored to fit your particular problems. You'll be glad you have this type protection in case of crippling law suits.

## 4 Liberty protects your company

Jury awards for bodily injury can put a driller out of business. Liberty's Public Liability coverage is what you need — and Liberty engineers will help keep your drilling site safe.

## Why are drillers switching to Liberty?

They get comprehensive, tailor-made protection. Our experienced loss prevention engineers work with them right on the rigs. We give them 24-hour claims service. Our famed medical program provides a team of top medical specialists to help speed recovery of a seriously injured man. They have saved through Liberty's generous dividends, and saved again through our other services. That's why drillers are switching to Liberty.

**MAIL THIS COUPON:**

Find out what Liberty can do for you. Mail coupon to Mr. Donald Cameron, Liberty Mutual Insurance Company, P.O. Box 6623, 3200 Maple Avenue, Dallas 19, Texas.
In California, mail it to Mr. W. L. Legrow, Liberty Mutual Insurance Company, 216 Pine Street, San Francisco 4, Calif.

LIBERTY MUTUAL INSURANCE COMPANY
P. O. Box 6623, 3200 Maple Ave., Dallas 19, Texas

Gentlemen:
I should like to compare my present insurance with Liberty's service and savings.

Name..... Title.....

Address.....

City..... State.....

# Naugatuck KRALASTIC

## KRALASTIC PIPE cut laying time 75%

Members of the Biltmore Forest Country Club in Asheville, N.C., were able to "get out" and "play through" during the installation of their new underground sprinkling system. This system, made up of over 6 miles of Kralastic® pipe ranging in size from 6" main lines to 1¼" laterals, will soak their 50-acre golf course with over one million gallons of water in a 24-hour period. And it was installed in less than 4 weeks' time...only one-fourth the time estimated for laying a similar system of metal pipe.

An extrusion of a resin-rubber blend, Kralastic pipe weighs only about one-seventh as much as iron pipe... eliminates the expense of special trenching, bedding and handling equipment. Hard, tough, but easily worked, Kralastic pipe can be quickly cut with a hack saw then permanently joined with a solvent weld, eliminating the expense of special cutting and threading operations.

Kralastic pipe also offers superior physical properties that make it a wise, long-term investment. It won't rust, rot or corrode, and is impervious to water and soil elements.

No wonder the demand for Kralastic pipe is growing by leaps and bounds...for transmitting water for irrigating and drinking...for carrying natural gas...for handling corrosive chemicals, crude oil and salt water...and as electrical conduit!

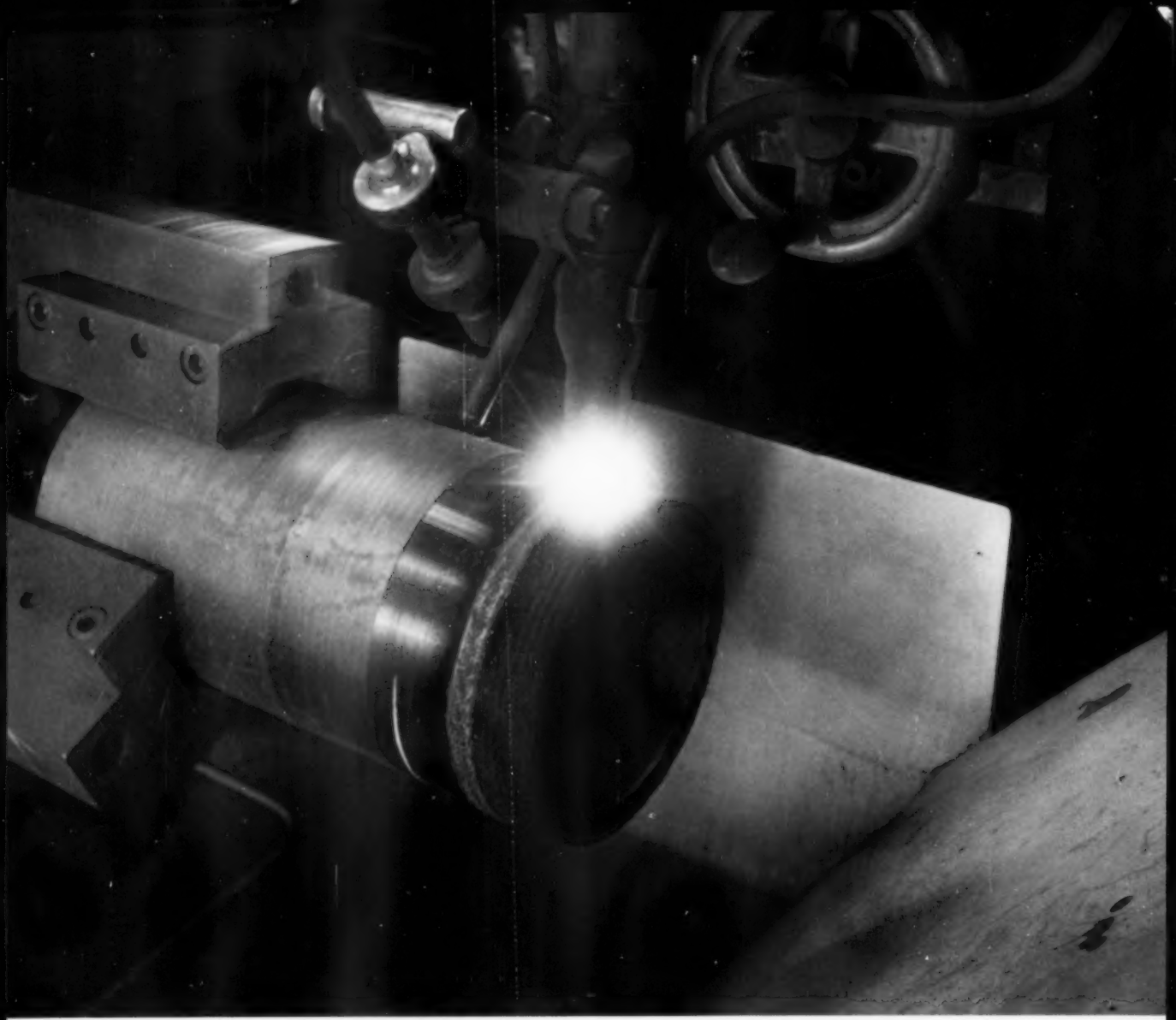
US RUBBER

**United States Rubber**

**Naugatuck Chemical Division** 428K Elm Street Naugatuck, Connecticut

Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

**DIST. OFFICES:** Akron • Boston • Gastonia • Chicago • Los Angeles • Memphis • New York • Phila. • **CANADA:** Naugatuck Chemicals, Elmira, Ont. • **CABLE:** Rubexport, N.Y.



Multiple bands of tungsten carbide are continuously overlapped on this Spang tool joint as it rotates at a constant, predetermined speed.

# Why Spang Banded Hardfacing is unmatched

THE NATIONAL NSCO SUPPLY COMPANY

Spang Hardfacing affords the best protection ever developed for tool joints in abrasive formations.

The method of application is the tungsten inert gas welding process. Multiple bands of tungsten carbide are continuously overlapped on the scale-free surface to form a solid band. In the tungsten inert gas welding process, the tungsten carbide particles are automatically "plowed into" the joint surface in exact, metered quantities. No grooves are required for this application, and everything is automatically controlled to eliminate human error. Each joint is pre-heated to further insure a perfect bond between the parent metal and hardfacing material. Each tool joint is stress relieved after hardfacing to make sure the physical properties of the parent metal are not impaired.

The results of these careful operations are: high saturation and uniform distribution of tungsten carbide particles—on the surface *and* throughout the depth of the deposit; a solid band of protection—providing a surface resistant to abrasion where the wear occurs; high resistance to chipping because of the solid particle-to-metal bond.

Spang Hardfacing is a typical result of National's product research and development program. Like all Spang processes and products available at National Supply, quality control insures its superiority.

# Why operators buy
# Spang Drill Pipe and Tool Joints

When the drilling schedule is difficult, it pays to have a quality drill string. Operators buy Spang Drill Pipe because they know that its performance has been proven in countless wells.

Look at these features of the two types of Spang Tool Joints.

**Spangweld**—Tool joints are welded to the drill pipe by an automatically controlled operation assuring accurate alignment and a high quality weld. Welding permits a streamlined contour and a reduced initial cost due to elimination of numerous machining operations.

**Spang Double Seal Shrink Thread**—Tool joints can be removed and replaced in the field, saving the cost of returning the string to a field shop. Joint design has an outer seal, threads, and inner seal all on a single cone. This insures uniform, reliable installations both at the mill and in the field, and completely seals against internal and external pressures.

As well depths and costs increase, these are desirable drill pipe features to rely on. Moreover, you can get the extra protection of Spang Banded Hardfacing (either "Banded Medium Density" or "Banded High Density") for abrasive service conditions, and Spang Plastic Coating for corrosive conditions (see below).

Specify Spang Drill Pipe for your tough jobs, and you'll get a good start toward lower operating costs!

If you need maximum protection against corrosion, specify Spang Plastic Coating. Scientifically applied at the mill with specially-developed facilities, it is the best you can buy. Available in Spang Drill Pipe, Tubing and Line Pipe (shown here).

◀ Spangweld and Spang Double Seal Shrink Thread Drill Pipe are available in a full range of sizes, including diameters for slim hole operations.

***Protect a good drill string with National Collars—next page...***

To insure true straightness, the entire length of a National Drill Collar is carefully gauged. Core samples from the trepanning operation are examined and measured for bore concentricity.

# Why National Drill Collars give extended service

Proper joint design and rigorous manufacturing standards are the reasons why you obtain outstanding drill string protection when you specify National Drill Collars. Made from alloy steel, these precision collars are hardened and tempered full length for high strength. True center bores are machined on a special lathe designed for this purpose. In the threading operation, a stress relief groove is made in both box and pin to provide maximum fatigue resistance.

The results are drill collars that promote maximum penetration rates at all drilling speeds, and extend the service life of your drill string. See a National Supply representative soon about the drill collar sizes to meet your needs.

National Drill Collars are simultaneously bored from both ends on a 165-ft. trepanning lathe especially designed for this purpose.

**SPANG-CHALFANT DIVISION**

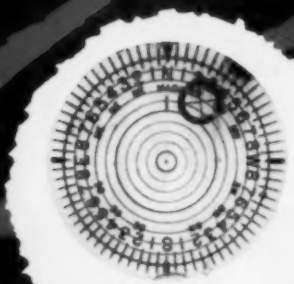
MAIN OFFICE: Two Gateway Center, Pittsburgh 22, Penna.

DIVISION TUBULAR OFFICES: Denver, Colorado; Houston, Texas; Dallas, Texas; Los Angeles, California; Toledo, Ohio; Tulsa, Oklahoma; Calgary, Alberta, Canada; (Export) New York, N. Y.

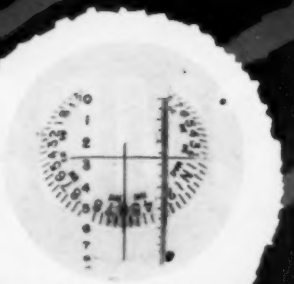
NATIONAL BLUE OIL FIELD MACHINERY AND EQUIPMENT
SPANG STEEL PIPE AND ELECTRICAL CONDUIT

# EASTMAN

## TYPE "R" SINGLE SHOT SURVEY INSTRUMENT



10° Single Shot



90° Single Shot Disc

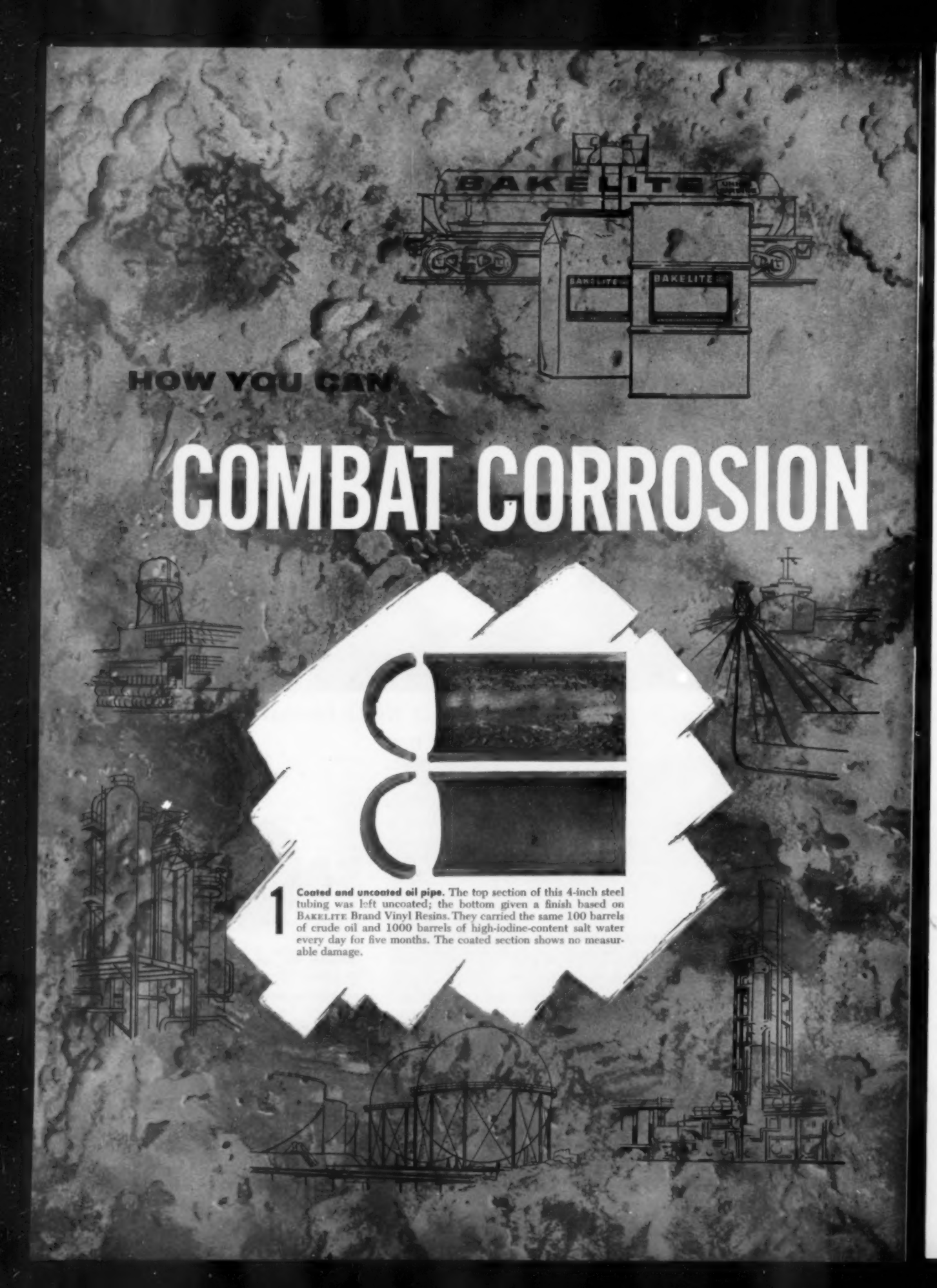
**YOU GET A PICTURE EVERY TIME ... regardless of heat, moisture, or other factors.** THE TYPE "R" SINGLE SHOT INSTRUMENT is one of the newest contributions to Eastman's many achievements. Among many of its unique features are: (1) All important parts made of stainless steel which prevents rust and corrosion, and makes it easier to keep the instrument clean. (2) YOU GET A PICTURE EVERY TIME regardless of heat, moisture, or other factors. (3) It can be operated in open hole, or run through the drill pipe and positioned in a non-magnetic drill collar or projected outward through an Eastco Survey bit. It is the most advanced design in the field today.

EASTMAN

**EASTMAN OIL WELL SURVEY COMPANY**
LONG BEACH • DENVER • HOUSTON • CALGARY

**EASTMAN INTERNATIONAL DIVISION**
*For Export Write*
P. O. BOX 1500 DENVER 1, COLORADO, U.S.A.

*DIRECTIONAL DRILLING . . . SIDETRACKING . . . OIL WELL SURVEYING*

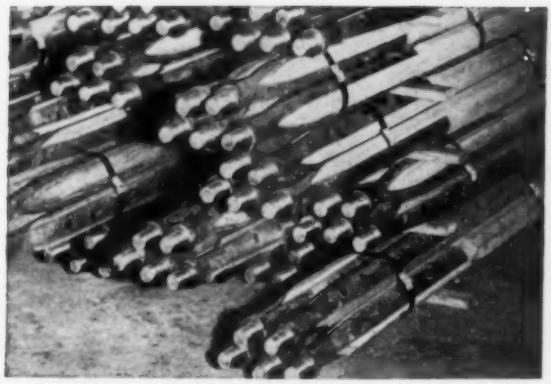



HOW YOU CAN

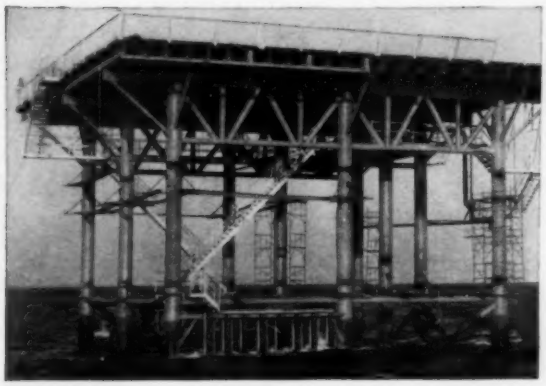
# COMBAT CORROSION



1 **Coated and uncoated oil pipe.** The top section of this 4-inch steel tubing was left uncoated; the bottom given a finish based on BAKELITE Brand Vinyl Resins. They carried the same 100 barrels of crude oil and 1000 barrels of high-iodine-content salt water every day for five months. The coated section shows no measurable damage.



**2** **BAKELITE Brand Phenolic Resins** used in the coatings on these sucker rods have put an end to rust on the coupling threads. Several other types of coatings tested failed to give needed protection. Now large stocks of rods can be held outdoors indefinitely without fear of rusting.



**3** **BAKELITE Brand Vinyl Resins** are in coating systems used on offshore drilling structures. These coatings are expected to last for two years, yet it takes only three weeks to cover the average structure. They provide excellent protection against the sand, mud, shale, and oil of drilling operations, as well as sea water.

# with BAKELITE plastics

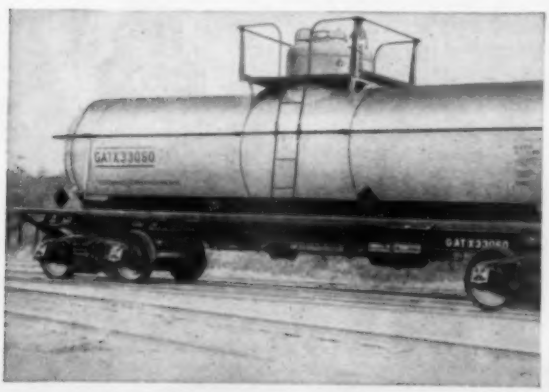
BRAND

Throughout the petroleum industry, coatings systems based on BAKELITE Brand Resins are winning the battle against corrosion—and saving millions of dollars annually. Vinyl, phenolic and epoxy resins have repeatedly proved their resistance to chemicals . . . weather . . . corrosive atmospheres . . . salt water and other destructive agents.

**Economy a major advantage.** Protective coatings based on BAKELITE Brand resins adhere strongly to metal even under abrasion and impact. They provide years of trouble-free protection with far less maintenance . . . for more long term economics. They are quickly, easily, and economically applied. Case histories show that coatings based on BAKELITE Brand resins often last for years where others failed in months.

**Bakelite Company will help you** to find the best system for your needs. You work through a single authoritative source for a variety of resins. Bakelite Company has the vinyls, phenolics and epoxies to meet the needs of specialized coating formulations. The laboratory and research facilities of Bakelite Company are backed by years of experience in formulating resins for coatings to meet the most rigid requirements, including government specifications.

**Free coatings booklet:** "Bakelite Resins for Surface Coatings." Write Dept. CC-128.



**4** **BAKELITE Brand Phenolic Resins** are used in the aluminum-pigmented finish on this tank car. For *nine years*, the coating has demonstrated continuous resistance to chemical fumes, abrasive particles, coal fumes that create dilute sulfuric acid.

**BAKELITE** BRAND **PLASTICS**

**UNION CARBIDE**

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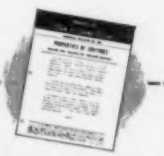


**BAKELITE COMPANY, Dept. CC-128**
**Division of Union Carbide Corporation**
**30 East 42nd Street, New York 17, N. Y.**

Please send me a free copy of Technical Bulletin No. 229, which charts the properties of coatings based on BAKELITE Brand Resins.

Name_____

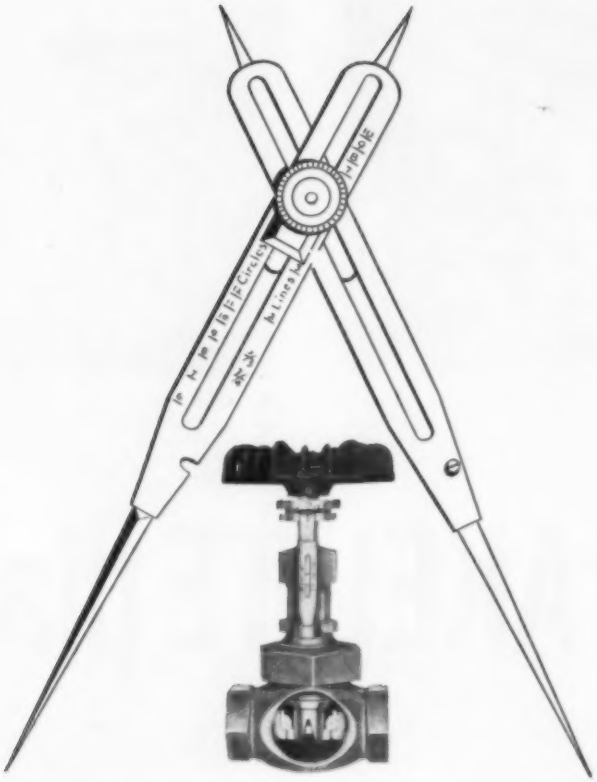
Title_____

Firm name_____

Street_____

City_____ State_____

Type of equipment to be protected_____



# PROPORTIONER

## controls flow to save for you

The V-port disc in all Hancock "Flocontrol" Valves insures proportional flow throughout the entire lift of the stem. They are valves that help you achieve uniform product quality through closer control, save steam and fuel on process work, and cut maintenance costs.

"3 in 1" valve design combines variable orifice with shut-off and micrometer dial and pointer. The valve opening can be set within 1/10 turn of the handwheel —you can duplicate all settings easily, instantly. No shut-off valve required—flow is in a straight line, with separate shut-off seating surface located away from the V-ports.

Hancock "Flocontrol" Valves are available in Bronze and Steel to meet the most demanding services. Ask your industrial supply distributor for details.

Hancock "Flocontrol" valves assure positive pinpoint control—eliminate all guesswork.

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

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***HANCOCK "FLOCONTROL" VALVES***

***A product of***

**MANNING, MAXWELL & MOORE, INC.**

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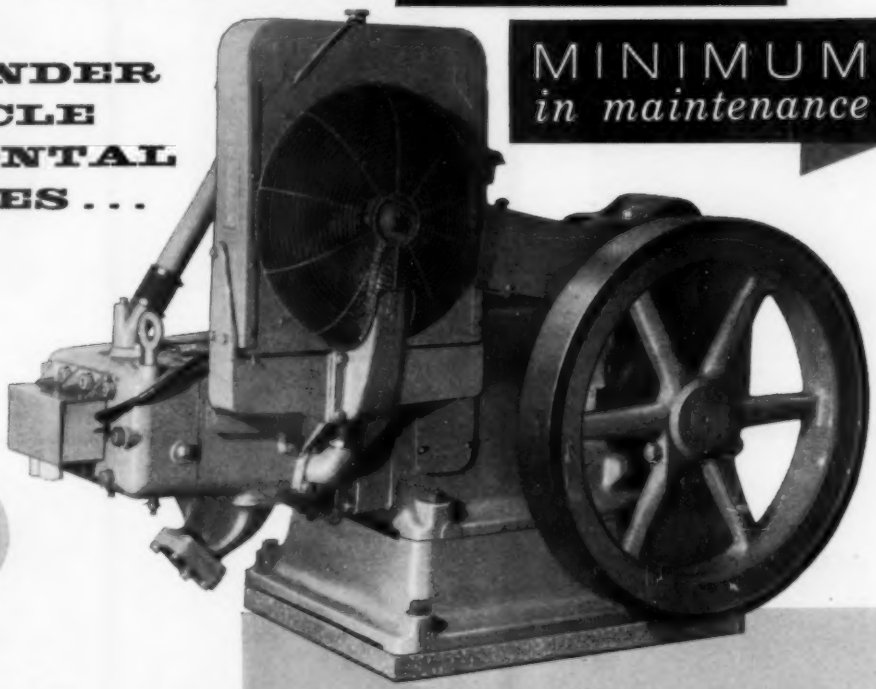
MAXIMUM *in performance*

MINIMUM *in maintenance*

## 2 CYLINDER 2 CYCLE HORIZONTAL ENGINES . . .



*You Can Relax When Your Lease Is* **LUFKIN EQUIPPED**

**AVAILABLE IN TWO POPULAR SIZES**

**H-795 — 45 TO 65 H.P.**
THERMOSYPHON COOLED

**HC-333B — 20 TO 30 H.P.**
CONDENSER COOLED

**HT-333B — 20 TO 30 H.P.**
THERMOSYPHON COOLED

**COMBINES THE ADVANTAGES OF SLOW SPEED, RUGGEDNESS AND LONG LIFE WITH THE SMOOTHER POWER DELIVERY OF EXTRA CYLINDERS.**

**FEATURES FOR LOW MAINTENANCE . . .**

1. **Constant oil level control keeps crankcase filled to proper level from 55 gallon tank requiring make up oil at long intervals. (Optional).**
2. **Lubricator automatically filled by filtered oil from crankcase.**
3. **Low tension ignition assures longer service life from magneto and spark plugs. (Optional).**
4. **Heavy duty long life spark plugs to reduce frequency of replacement or adjustment. (Optional).**
5. **Extended service clutch requiring greasing at long intervals. (Optional).**
6. **Prepacked fan hub assembly to provide servicing only at long intervals.**
7. **Automatic controls for low oil level or low oil pressure and for high water temperatures.**
8. **Engines are provided with weather covers to protect all parts and allow engine to operate in the open without further protection.**

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Ⓐ *Iso-Kel* (*8pp*). Details of a new isomerization process which gives greater flexibility and economy in making all grades of gasoline.

Ⓑ *Kwinana Refinery* (*16pp*). Details of the huge BP plant in Australia; its numerous offsite facilities; and how work was coordinated.

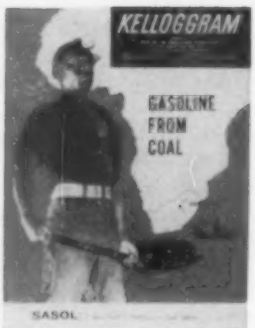
Ⓒ *Continuous Analysis* (*8pp*). An instrument engineer reports on analyzers as a key to improved processing. Types of analyzers are described.

Ⓖ *Daura Refinery* (*12pp*). A description of Iraq's Baghdad project, printed in Arabic, English, and Hindi. Emphasis is given to utilities problems.

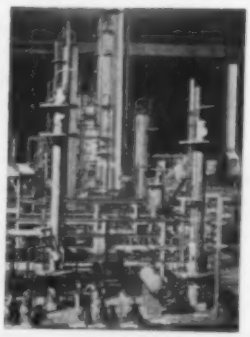
Ⓗ *New Instruments for High Pressure* (*8pp*). A report from a leading instrument engineer as to how tomorrow's processes above 10,000 psi will be measured.

YOURS FOR

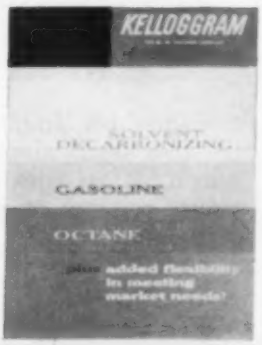
Ⓘ *Concon Refinery* (*8pp*). Printed in Portuguese, Spanish, English, this account of Chile's first major refinery highlights design features and economics.




Ⓜ *Gasoline from Coal* (*12pp*). This report on the world's largest commercial plant of its type gives details of process, yields, other pertinent facts.

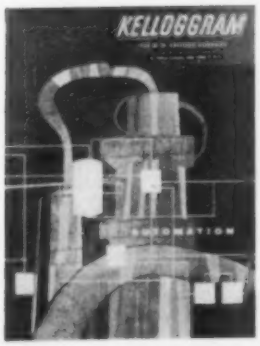


Ⓝ *Models* (*12pp*). A comprehensive description of the time-and-money-saving technique of using scale models as design tools. Many examples are illustrated.




Ⓞ *Solvent Decarbonizing* (*16pp*). A highly documented review of this flexible process for producing high octane and meeting varying market needs.

# Engineering Experience




**D**

*Automation (16pp).* An easy-to-grasp treatise of a complex subject. Graphically explains automation and the instruments that make it work.

**E**

*Hydrogen Sulfide Corrosion (22pp).* A compilation of technical information on sulfide corrosion at high temperatures and pressures in the petroleum industry.

**F**

*The 450 Ton Lift (8pp).* A dramatic account, with photos taken on the spot, of the lifting and positioning of a Texas Tower. Diagrams show how it was engineered.

**J**

*The Giant Step (20pp).* From Kellogg's Defense Products Division, a guide for engineers facing technological problems in developing or producing defense materiel.

**K**

*Yorktown Refinery (16pp).* A record of cooperation in engineering and building a 35,000 BPD refinery for Amoco, including effluent treating facilities.

**L**

*Calculation of Liquid-Vapor Equilibrium Constants from Solubility Data (8pp).* One of many technical papers written for the chemical press by Kellogg engineers.

Among these 15 booklets and folders are many that Kellogg believes would be helpful to oil refiners and others. Largely a record of some of the company's engineering and construction work over the past few years, they cover a diversity of technological and economic problems and how they were solved.

Kellogg's Contract Sales Division welcomes the opportunity to share this valuable experience with others by sending, without charge, copies of any or all of the items listed to interested petroleum refiners or chemical companies. Requests will be filled in the order received, since the supply is limited. There is no obligation, but use of the coupon would be appreciated in order to facilitate handling.

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Your Well Is Safe With

# RECTORHEADS

*the head that seals with the Ring-of-Steel*

More than 125,000 Rector casing head installations prove that you can forget about pressure leaks when your well is equipped with Rectorheads. For working pressures to 15,000 psi . . . regardless of temperature extremes . . . the Rector ring-of-steel provides a lifetime seal.

There is no resilient packing to flow under pressure or deteriorate from heat or time. The casing is welded to a steel ring that fits in a precision ground seat. There is no stress on the weld when the flange bolts are tightened. A steel API ring gasket completes the permanent, maintenance-free seal.

For well safety and long range economy, specify RECTORHEADS . . . now in sizes through 20". Order from your favorite SUPPLY STORE.

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# PROVED UNDER TOUGHEST CONDITIONS

## *So they standardized 100% on "Jimmy" Diesels!*

*"Not one troublemaker in a fleet load of 'Jimmy' Diesels,"* reports Galveston's Falgout Boat Company, who have 70 General Motors Diesels powering crew boats and supply vessels.

Standardizing 100% on 2-cycle "Jimmy" Diesels, this operator explains: "GM Diesels have proved themselves to us over many years under the toughest and most rigorous conditions. They operate day in and day out, year after year, with less repair costs and less downtime than any other Diesels we have had. And when we do need a repair part, there's no waiting. GM Diesel parts and service outlets are located in all major ports."

Many of Falgout's larger supply boats, like the new "M.E.L.1," are powered by *multiple* GM engine units because, as this owner says, "They offer a greater degree of safety and dependability than one large engine, yet cost *less* than a single engine of comparable horsepower." For dependable, low-cost Diesel power for any job on land or water, call in your GM Diesel distributor.

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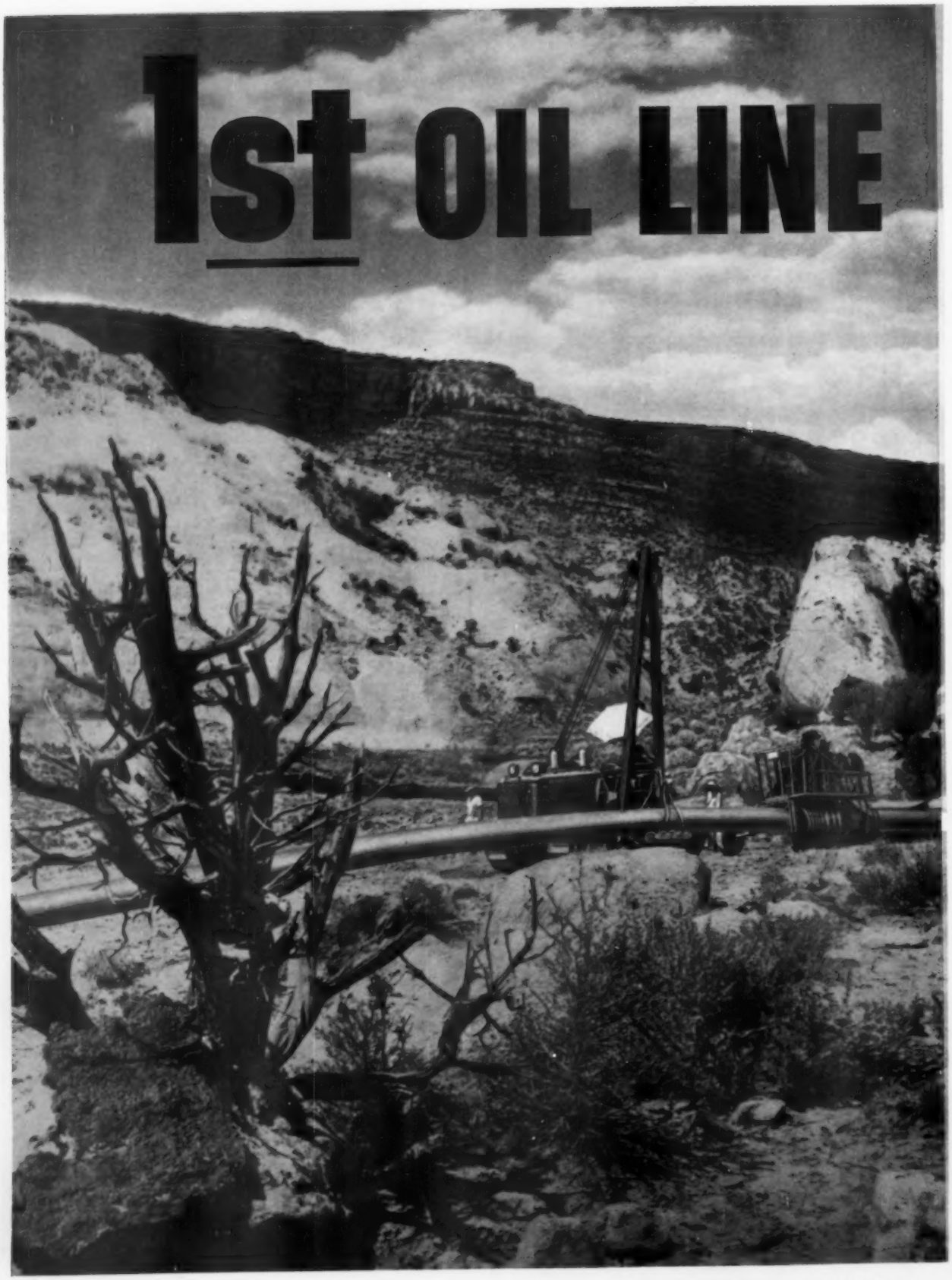
Regional Offices: New York, Atlanta, Detroit, Chicago Dallas, San Francisco

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario

Parts and Service Worldwide

*Single Engines—30 to 364 H.P.*
*Multiple Units—Up to 893 H.P.*

Falgout's 142-ft. supply ship "M. E. L. 1" is powered by two GM "6-110" Tandem Twins (880 cont. S. H. P.) and has a "4-71" auxiliary light plant.


1st OIL LINE

# TO CALIFORNIA

## The Four Corners Pipe Line is the first line ever built to supply California refineries with oil from outside the state

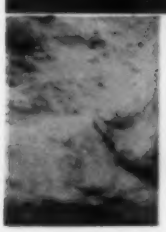
**Shell Pipe Line Corporation,** acting as agent for the Four Corners Pipe Line Company, designed, constructed and will operate this important 16-inch line. The line itself will be owned by six companies — Continental Pipe Line Company . . . Gulf Oil Corporation . . . Richfield Oil Corporation . . . Shell Oil Company . . . Standard Oil Company of California . . . and Superior Oil Company.

The purpose of the line is to tap reserves of 250 to 500 million bbls. to meet anticipated expansion in California's economy.

**A. O. Smith** furnished more than 600 of the 637 miles of 16-inch main line that runs from Aneth, Utah, to Los Angeles.

**For almost 30 years** . . . A. O. Smith line pipe has always been manufactured to a high standard of quality . . . precisely controlled at every step of production. That's why A. O. Smith pipe, made and installed in 1928, is still in operation. That's why so much A. O. Smith pipe is found in every important pipeline project.

From Aneth, Utah, to metropolitan Los Angeles, the line surmounts many obstacles. They include—elevations ranging from sea level to 6700 feet . . . deserts . . . three major river crossings . . . 200 miles of solid rock . . . and daily temperatures fluctuating between 40 and 120° F.



*Through research* ... *a better way*

**A.O.Smith**

CORPORATION

**TUBULAR PRODUCTS DIVISION**

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# THE HEAVIER THE LOAD...

the more you need HYATTS . . . because nothing else can equal straight cylindrical roller bearings for sheer load-carrying capacity. That's why many of the world's largest crawler tractors are equipped with HYATT Hy-Rolls.

# THE HIGHER THE SPEED...

the more you need HYATTS . . . because they are precision-built with painstaking control of internal clearances to run smoothly even at 40,000 rpm, as in this Solar portable gas turbine pump developed for fighting fires.

## THE MORE YOU NEED *Cylindrical* HY-ROLL BEARINGS

Heavier loads and higher speeds, which must often be accommodated in more compact housings than ever before, are causing problems for many a design engineer these days. If you're among those who are finding that previously-used bearings are no longer good enough, *it's time to switch to HYATTS.* In America's most complete line of straight cylindrical roller bearings you'll find space-saving separable types with ample capacity to carry your radial loads, or flanged race types which will take a surprising amount of thrust. When you lay in HYATT Hy-Rolls you make *sure* of longer, smoother performance at the lowest cost per hour of service. Ask your nearest HYATT Sales Engineer for recommendations —you'll find him mighty helpful! Hyatt Bearings Division, General Motors Corporation, Harrison, N.J.; Pittsburgh; Detroit; Chicago; and Oakland, California.

THE RECOGNIZED LEADER IN CYLINDRICAL BEARINGS

GM FORWARD FROM FIFTY

# HYATT HY-ROLL BEARINGS

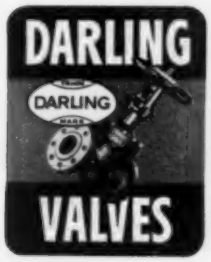
THE "WORKHORSES" OF MODERN INDUSTRY

# ALUMINUM GATE VALVES

## by Darling

Darling gate valves of aluminum alloy offer all of the unique, extended-life features inherent with the Darling fully revolving double disc, parallel seat principle... for performance that assures unmatched economy... and freedom from leakage, trouble and downtime!

These Darling aluminum alloy valves are now available in ½" through 24" sizes. Write for full details, specifying your particular service requirements.

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WILLIAMSPORT 1, PA.

# Vornado automobile air conditioning brings a new kind of comfort and safety!

If your working day calls for hours-a-day on the road—you'll look better . . . feel better . . . and be in better shape at the end of your run for business or leisure—with Vornado.

What's more—you can be up to a 44% *Safer Driver, Too!*

**VORNADO IS THE *ONLY* AUTOMOBILE AIR CONDITIONER *PROVED* ON THE BLISTERING ARIZONA DESERT**

Test results conclusively indicated that a driver feels better, eats better, sleeps better . . and IS A SAFER DRIVER BY UP TO 44%—when he is driving an air-conditioned car!

**START COOL . . . DRIVE COOL . . . ARRIVE COOL! ONLY VORNADO GIVES YOU ALL THIS:**

- Exclusive Curved Cooling Coil — ⅓ greater area than most
- Five Air Circulators — 2 more than most
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**NOW AVAILABLE:**
**15-Minute Sound Film on Vornado's Daring Arizona Desert Test (16mm)** . . . sent on request for industrial showings. Write us today!

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*World's leading full line manufacturer of comfort cooling appliances*

*keep 'em turning*
*to the right . . .*

*with quality engineered*

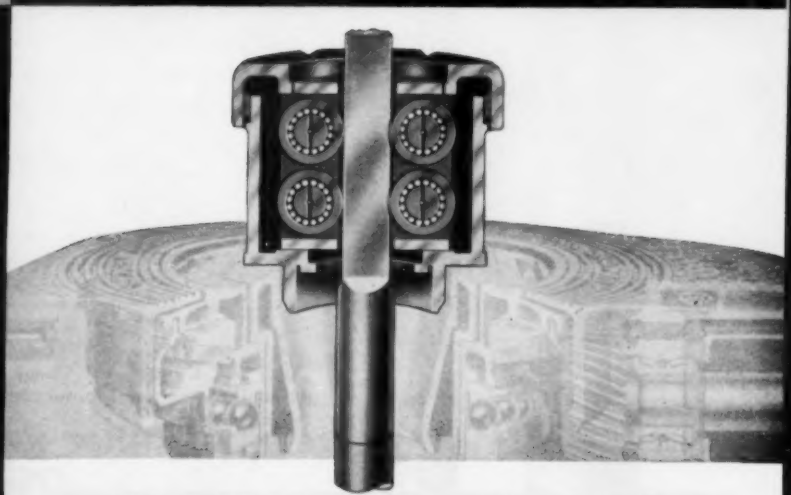
# BAASH-ROSS
## ROLLER KELLY DRIVE BUSHINGS

Precision engineered and ruggedly constructed, Baash-Ross roller kelly drive bushings always operate smoothly and efficiently under extremes of torque and rotary speeds.

Key feature of this bushing is the assembly of tandem rollers—in both square and hexagonal models—with eight or twelve large diameter rollers, with non-friction bearings, in constant positive contact with the kelly faces. Kelly wobble is prevented and stability is assured.

Since the rollers always provide smooth, friction-free feeding, weight indications are accurate; damaging impacts to drill string and other equipment can be avoided.

Superior performance has made Baash-Ross kelly drive bushings preferred in the industry. For additional information write to P. O. Box 1348, Houston 1, Texas, or see the Composite Catalog.



Individually lubricated rollers rotate on precision roller bearings.

**BAASH-ROSS DIVISION**
**OF JOY MANUFACTURING COMPANY**

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BAASH-ROSS
JOY

*For Dual String Completions – Flowing or Pumping*

# *Use* GUIBERSON'S RETRIEVABLE TYPE RD PACKER

Type RD Packer with Anchor and Plain Stinger

This cleanly designed, rugged packer is an outstanding Guiberson development for dual string installations in wells of any depth.

Outstanding in performance because it operates perfectly with both zones flowing, high or low differential pressure; with either zone flowing, the other zone pumping; with both zones pumping; with either or both zones on gas lift: or for multi-zone injection — gas or water.

Outstanding in advantages because it completely isolates each zone from the other and from the casing; provides full opening long string to lower zone; permits either string to be pulled or run separately.

Guiberson's RD packer does complex dual zone jobs so well that operators tell us it's their best investment for dual string production. Ask your Guiberson representative about installation and auxiliary equipment recommendations.

Guiberson's RD packer has smooth operating dovetail slips of heat-treated alloy steel. Packing rubber is one-piece sleeve type — will not vulcanize in the well, made of Guiberson's special oil and gas resistant compound. You can get the RD packer with or without anchor, and a choice of stingers, plain or with snap-ring. Piston slips have extra large gripping area, are heat-treated alloy steel and keyed to anchor body up to maintain proper alignment. Get the Best — Get Guiberson.

THE GUIBERSON CORPORATION

ESTABLISHED 1919
DALLAS, TEXAS
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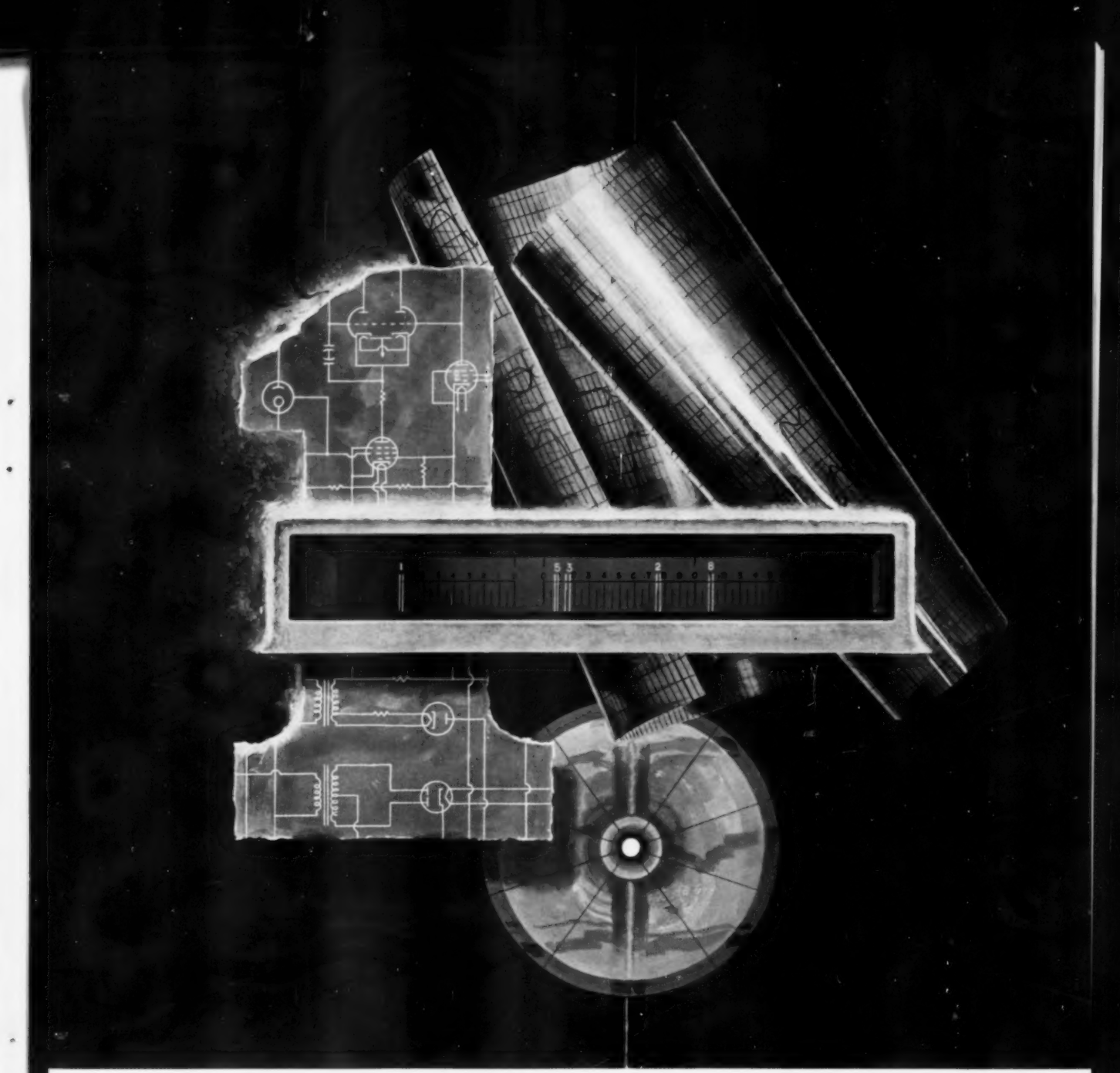
Sold by
Oil Field Supply Stores
Everywhere



# So you can look where you can't see

Oil industry technology took a big step forward when the Schlumberger Electrical Log was developed. Ever since the day oil was discovered, man has "strained his eyes" to see underground in an effort to accurately determine oil deposits.

The basic Schlumberger Electrical Log gave the industry eyes to see with . . . eyes that have been the first to see most of the present oil reserves throughout the world.

The Schlumberger Electrical Log . . . the pioneer system for all logging techniques . . . has been refined and improved year after year, along with resulting companion services. It is a quick, economical and accurate method of securing a permanent record of the formation penetrated. It is the master key to successful exploration.

When you call Schlumberger, you can be sure of the most reliable electrical log in the field and the best service obtainable. No other electrical log can ever give you Schlumberger quality.

THE EYES OF THE OIL INDUSTRY®

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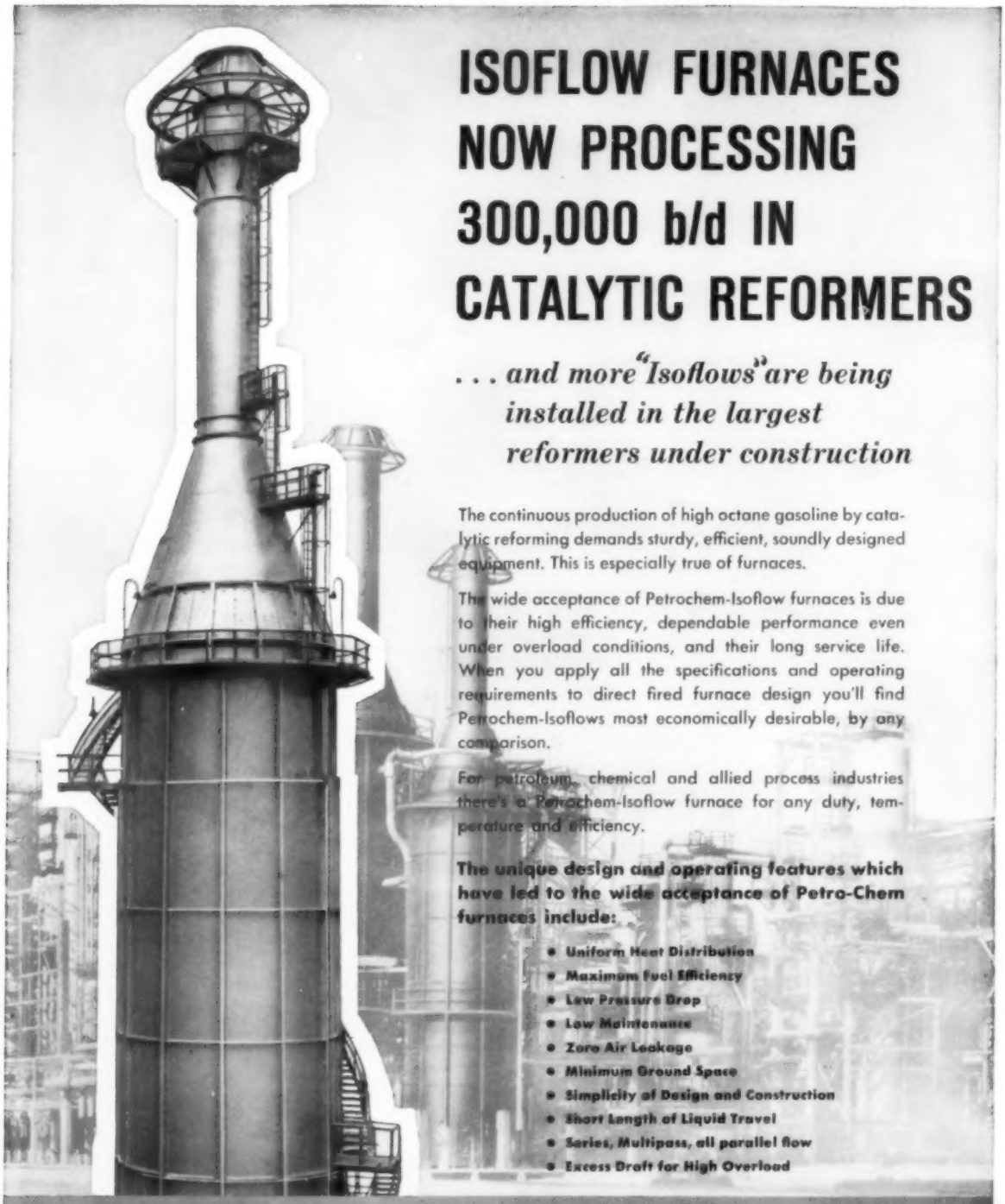

# ISOFLOW FURNACES NOW PROCESSING 300,000 b/d IN CATALYTIC REFORMERS

*. . . and more "Isoflows" are being installed in the largest reformers under construction*

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The wide acceptance of Petrochem-Isoflow furnaces is due to their high efficiency, dependable performance even under overload conditions, and their long service life. When you apply all the specifications and operating requirements to direct fired furnace design you'll find Petrochem-Isoflows most economically desirable, by any comparison.

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- **Minimum Ground Space**
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# They Say—

## Bring back the Model T!

Dear Sir:

Foreign cars (OGJ, April 14, p. 72) are here to stay unless the U.S.A. wakes up and puts out a cheap car. Fords and Chevrolets are as big as Cadillacs and Lincolns now. The low-priced three has slipped to Jeeps, Volkswagons, and Ramblers.

On our present good roads a Model T would do fine. Why not?

C. L. Thomas
Oklahoma City.

## Denver basin story "fine"

Dear Sir:

Congratulations on your fine general article titled "Much More Oil for Denver Basin" (OGJ, Mar. 31, p. 143).

This is the type of reporting that warms the hearts of those who believe in the future possibilities of the Denver basin. The problems of reserves and success ratio are ones which many of us are constantly trying to clarify. . .

J. R. Munford
District Geologist
Sun Oil Co.
Denver.

## Plan for "old" geologists

Dear Sir:

Professors and editors have their problems ("A Professor Laments . . . and An Editor Replies," OGJ, Mar. 17, p. 227), so, indeed, has the young geologist . . . But who laments about the problems of the aging general geologic practitioner or of those of the mature specialist who together form the inner core of the exploration group? . . .

How long can the aging specialist go on giving of his knowledge, his experience, before he exhausts himself professionally? Who assists him to refesh, widen, and deepen his knowledge? . . .

On the average the mature geologist must rely on papers and conventions for maintenance and improvement of his knowledge and performance . . . Is this a truly efficient and sufficient means . . . of overhaul and refilling of the tank of knowledge?

This mature specialist . . . (is) . . . the bulwark of the exploration group . . . A group can ill afford to lose the sum total of experience . . . of one of these technologists . . .

He has authority; but how can he keep it in the face of young arrivals who talk an altogether different language, are full of new theories, use different approaches, place emphasis on different factors, use methods which did not even exist 15 to 25 years ago when the mature technologist himself went to school?

This man . . . is certainly in need of facilities to refresh his theoretical knowledge . . . Here is a suggestion of how help can be given . . .

1. Enable a group of experts (from universities, institutes, and the industry) to meet periodically to review progress and new developments in theoretical and practical geology by subjects . . . results then published in form of easily accessible progress reports . . .

2. Organize and conduct refresher courses for "old" geologists (over 15 years out of university) for the purpose of teaching them new methods and discoveries and of discussing the progress reports in seminars . . . .

In time, once such a system of post-post graduate education is under way it could be extended and made world wide . . . The problem is to find a sponsor, organizer, and, of course, initial capital . . .

In this connection one thinks of the API, NASci., AAPG, AGI, and the society of geology teachers as sponsors . . . It is realized that a system of symposiae is already being sponsored by SEPM, etc. That is a good beginning but by far not enough . . .

An Oil and Gas Journal Reader
Calgary.

## Williston situation a lulu

Dear Sir:

The entire editorial staff of the Montana Oil Journal (me) wishes to congratulate you upon excellence of your Williston basin article (OGJ, Mar. 24, p. 253).

The basin is full of sleepers and it requires articles such as this to jolt the master minds in such far away spots as Tulsa, Houston, and New York, where control of the purse strings is centered.

One little lulu is the so-called Brorson field in Richland County, Montana. The discovery well came in with a flowing initial of 745 BOPD from Ordovician through 20/64 choke and yielded almost exactly 125,000 bbl. of high-gravity crude oil until pipe was shut off by shifting of Charles salt . . . Recompleted in Mission Canyon, it has yielded an additional 100,000 bbl. from that horizon.

The Williston situation is very interesting.

Al Raymond, Editor
Montana Oil and Mining Journal
Great Falls.

## Sri, Sir, and Mr.

Dear Sir:

Perhaps your proofreaders did not believe their eyes when they saw Sri K. K. Sahni, Sri N. R. Pillai, et al. in your article "India Signs Oil-Development Pact," (OGJ, Jan. 27, 1958).

They evidently changed Sri to read Sir, knowing that a number of distinguished Indians have been conferred knighthood by the British crown in times past. However, in these cases it should have stayed "Sri," since this is the Indian term corresponding to "Mr." in English.

I'd like to point out this minor, but worthwhile correction on behalf of our Indian coworkers here in Calcutta.

Frank T. Manheim
Producing Operations
Standard-Vacuum Oil Co.
Calcutta, India.

## Vote of thanks

Dear Sir:

The editorial concerning water-flood proration appearing in the March 31, 1958 (p. 43) issue of The Oil and Gas Journal is excellent.

In my opinion the industry owes your publication a vote of thanks for the clear, concise, and fair summation of a most vital problem. . .

I should like to order about 100 reprints of that editorial in order to give further emphasis to the subject by way of selected mailing to interested persons and companies.

As seems to be the case in many problems of this type, when the definitions of terms are clearly stated and agreed upon, the problems seem to solve themselves.

When all who are close to the water-flood problem will study the situation and determine the magnitude of water flooding, eliminating true pressure-maintenance projects, I believe the answer will be self-evident and state conservation bodies will have no difficulty in forming definite policies.

Many thanks for a splendid statement of the problem and for also including good suggestions toward a solution to it.

John F. Buckwalter
Ryder-Scott Co.
Petroleum Engineers
Wichita Falls, Tex.

# HIGHER PRODUCTION

## FROM DEEP AND HEAVY SALT WATER WELLS WITH

Cabot H36-27 Long Stroke Hydraulic Pumping unit is the answer to deep well and heavy salt water problems—and gives high volume production for moderate depths, too.

It features such improvements as: (1) Maximum simplicity of operation—only one start-up step, (2) Minimum counterbalance variation throughout the stroke cycle—large air volume counterbalance tank, (3) Simple direct-actuated reversing valve, (4) Clearly understood and easily explained circuit —no complicated piping, (5) Total capacity scavenge reservoir with oil-bath air cleaner protection, (6) Built in cooling in the oversize double wall counterbalance tank, (7) Continuous filteration—arranged to filter all the oil in the unit.

The air compressor and scavenge pump may be run independently to charge the system with air or oil without operating the main pump.

Front cross members are readily removable for well servicing.

The H36-27 has a rated capacity of 36,000 pounds polish rod load and can pump six—27 foot strokes per minute. The stroke length may be reduced by one foot intervals to 23 feet.

Highest quality materials have been used throughout to assure reliable and maintenance free operation.

*Tried a Cabot Lately? Beam, adjustable crank, hydraulic, and air balanced types.*

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FRANKS
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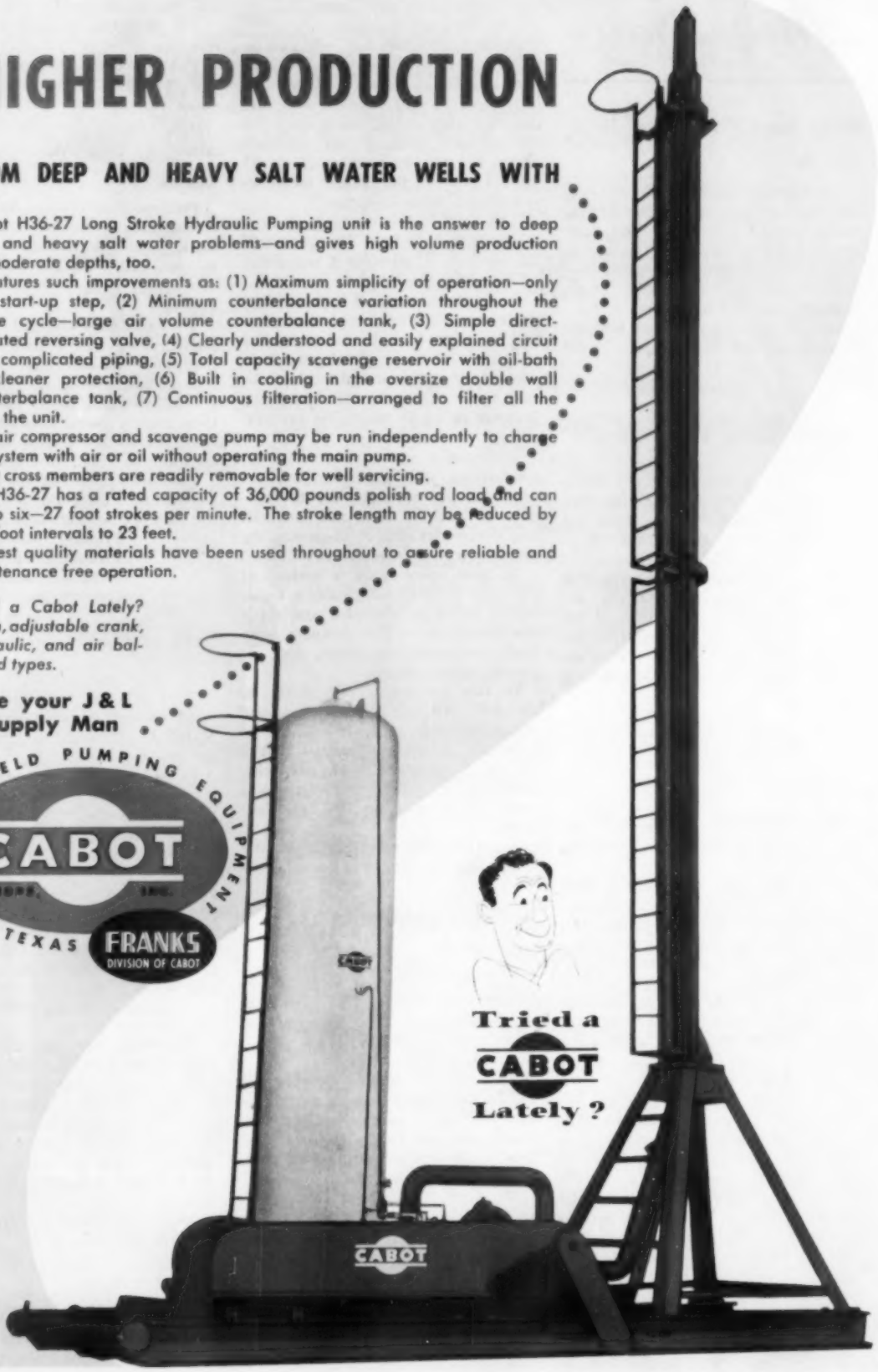


# CALENDAR OF EVENTS

**APRIL**

**27-30** American Association of Petroleum Geologists, Rocky Mountain section, Casper, Wyo.

**28-29** University of Oklahoma, third annual conference on automatic control in the petroleum and chemical industries, Oklahoma Memorial Union Building, Norman, Okla.

**28-29** Independent Petroleum Association of America, mid-year meeting, Sherman Hotel, Chicago.

**28-30** Southern Gas Association, annual convention, Dallas.

**29-May 1** Petroleum Industry Electrical Association, Petroleum Electric Supply Association, annual joint meeting, Adolphus Hotel, Dallas.

**MAY**

**5-6** Society of Petroleum Engineers of AIME, North Texas section, secondary-recovery symposium, Wichita Falls, Tex.

**5-7** Purdue University, thirteenth annual industrial waste conference, Purdue Memorial Union Building, Lafayette, Ind.

**5-9** American Gas Association, distribution, production, and transmission conference, Roosevelt and Commodore Hotels, New York.

**6-7** Pacific Coast Gas Association, gas supply and transmission conference, Town and Country Hotel, San Diego, Calif.

**7-9** American Petroleum Institute, Division of Production, eastern district meeting, Deshler-Hilton Hotel, Columbus, Ohio.

**8-9** Texas Petroleum Research Committee, eleventh oil recovery conference, symposium on "A Century of Texas Oil, 1875-1975," University of Texas, Austin.

**11-14** Texas Independent Producers and Royalty Owners Association, annual membership meeting, San Antonio, Tex.

**12-14** Chemical Institute of Canada, National Research Council, eighth Canadian high polymer forum, Macdonald College, St. Anne de Bellevue, Quebec.

**12-14** Instrument Society of America, symposium of analysis instrumentation division, Shamrock Hilton Hotel, Houston.

**12-15** American Petroleum Institute, Division of Refining, midyear meeting, Statler Hotel, Los Angeles.

**12-15** American Society of Mechanical Engineers, oil and gas power division conference, Bellevue-Stratford Hotel, Philadelphia.

**20-22** Pennsylvania Gas Association, annual meeting, Pocono Manor Inn, Pocono Manor, Pa.

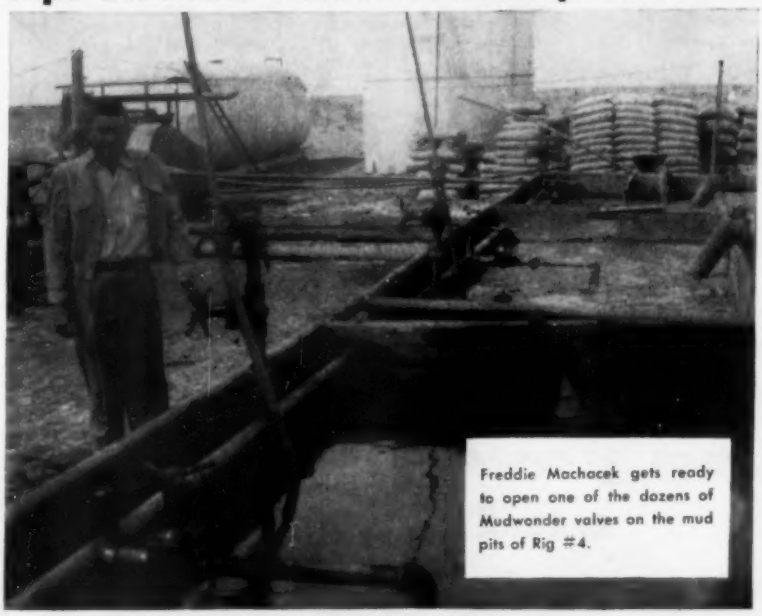
**21-22** Western Petroleum Refiners Association, Southwest regional technical-industrial relations meeting, Hotel Paso del Norte, El Paso, Tex.

**21-23** Rocky Mountain Oil and Gas Association, thirteenth annual convention, Cosmopolitan Hotel, Denver.

**21-23** American Petroleum Institute, Division of Marketing, midyear meeting Roosevelt Hotel, New Orleans.

**22-23** American Petroleum Institute, Divi-


## Tips on Mud Valves for Toolpushers . .



Freddie Machacek gets ready to open one of the dozens of Mudwonder valves on the mud pits of Rig #4.

## MUDWONDER Ideal for Versatile Service

**by Freddie Machacek, Toolpusher, Rig #4**
**B.B.M. Drilling Company, Midland, Texas**

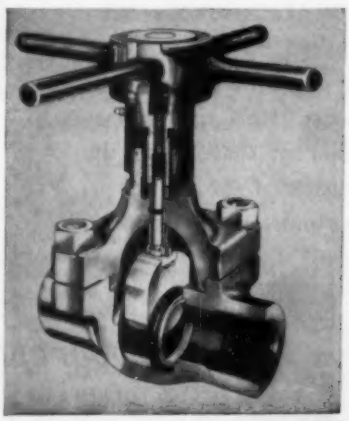
ABOUT two years ago I put a *Mudwonder* valve on our fill-up line just to see how it would make out. I soon found that *Mudwonder* worked fast and easily, without binding, even while bleeding off the line at 1600 lbs pressure. It did so well I tried more *Mudwonders* on the tough job of mud pit service—and they were so successful I've standardized on *Mudwonder* ever since!

Valves on mud guns and jets take a terrific beating, but we've had very little trouble with *Mudwonders.* As a matter of fact, our first ones are still in service; we replaced the stem packing on one valve—that's all! Because replacement parts are so easy to identify, we never have any trouble getting the exact part we need. In fact, the valves are designed to use the same seat and gate for both pressure classes.

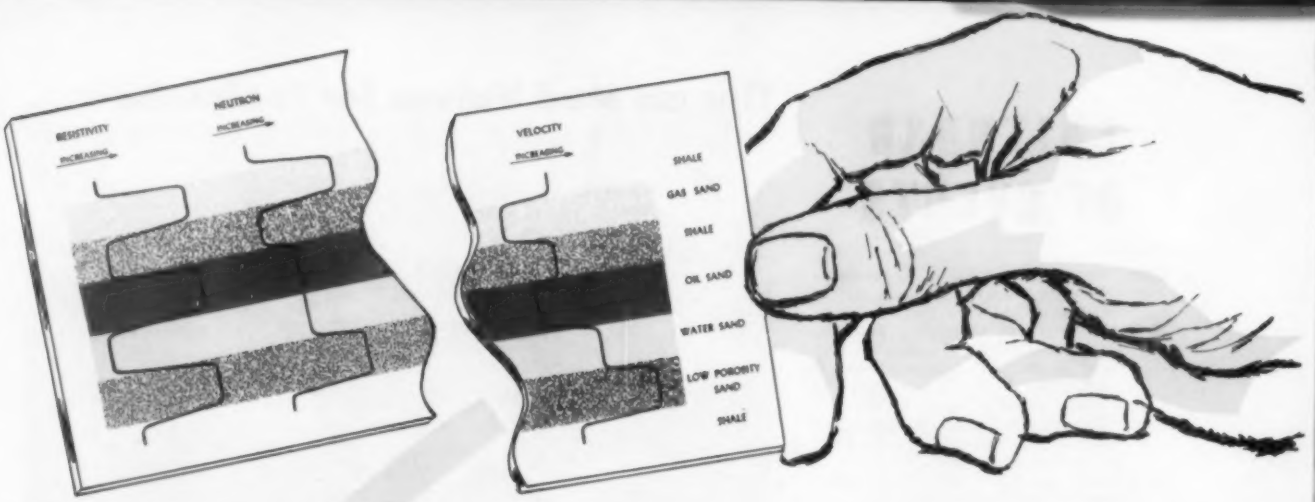
When we have to dress a *Mudwonder,* the job can be done without disturbing any connections. The valve is out of service only about 10 minutes, start to finish, regardless of size. Another thing—they never sand up. Bob Lawrence, Edward *Mudwonder* Representative, says this is because the design causes the mud to flush the bonnet automatically.

*Mudwonder* valves are available in 2", 3" and 4" sizes; with screwed or flanged ends; rated at 2000 psi WP (4000 psi test) and 3000 psi WP (6000 psi test). See your favorite oil field supply store for complete information, or write Edward Valves, Inc., East Chicago, Indiana, subsidiary of Rockwell Manufacturing Company.

**Mudwonder cut-away view shows the one-piece seat insert, with Buna-N molded integrally over steel wear rings; chromed gate with "T" slot connection; separated stainless stem and double thread construction.**



*(Advertisement)*

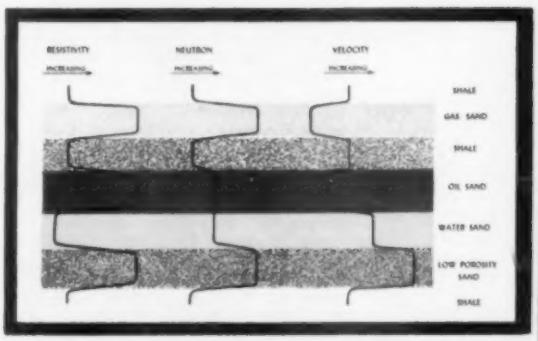



# Log your well and....

## LOCALIZE THE PAY ZONES WITH CVL

Single logging techniques are usually inadequate. Evidence developed in the laboratory now clearly suggests that *adding velocity* to the resistivity and the neutron logs should achieve a combination most effective for evaluating the oil and gas possibilities of certain formations penetrated by the drill. Positive differentiation between gas, oil or water, and the certain prediction of the porosity of sands cannot be achieved by any single logging technique. For instance, the neutron log does not differentiate between a gas and low porosity sand or between an oil and water sand.

The idealized logs shown here are taken from material prepared by Warren G. Hicks of Magnolia Petroleum Company, and are based on his study of numerous logs obtained in the Miocene belt of the Texas and the Louisiana Gulf Coast. Here the velocity in sand is lower than in the adjacent shales, and the resistivity is higher. In this instance, according to Hicks, hydrocarbon saturation is almost certain to exist.

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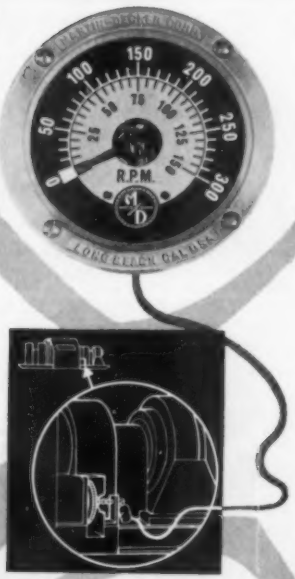
## Rotary Tachometer




### Increase Penetration

Drilling rate is a function of rotary speed. There is an optimum speed for each depth and formation. The driller must know rotary speed at all times so he can return to the optimum speed after each connection and make accurate reports.

### Save Equipment

Tool joints and rotary equipment are powered by more horsepower each year. They are designed for rugged use, but an instrument is needed to protect this investment against abusive use.

### The New Electric Tachometer

The new Martin-Decker Electric Tachometer is self energized. It is easily installed and calibrated to any rig. The new electric model has no mechanical tachometer cable which requires periodic replacement. The signal can be recorded on the new Martin-Decker electric recorders. This instrument is a rugged, dependable tool designed for years of active use.

WRITE FOR DESCRIPTIVE LITERATURE

MARTIN-DECKER CORP.
HOME OF THE WEIGHT INDICATOR
LONG BEACH, CALIFORNIA


sion of Production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles.

26-28 Chemical Institute of Canada, annual conference and exhibition, Royal York Hotel, Toronto.

27-29 Annual Short Course in Gas Technology, Texas College of Arts and Industries, Kingsville, Tex.

28-29 Rocky Mountain Oil and Gas Association, refining committee annual meeting, Cody, Wyo.

**JUNE**

2-4 University of Texas, short course and conference on automation and computers, University of Texas campus, Austin.

2-4 Petroleum Electric Power Association annual meeting Texas Hotel, Fort Worth.

5-7 National Oil Scouts and Landmen's Association, annual meeting, Mayo Hotel, Tulsa.

8-11 American Petroleum Institute, Division of Transportation, annual tanker conference, Greenbrier Hotel, White Sulphur Springs, W. Va.

8-13 Society of Automotive Engineers, summer meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

10-12 Appalachian Underground Corrosion Short Course, School of Mines, West Virginia University, Morgantown, W. Va.

19 Pennsylvania Grade Crude Oil Association, annual meeting, Penhills Club, Bradford, Pa.

22-27 American Society for Testing Materials, annual meeting and exhibit, Hotels Statler and Sheraton-Plaza, Boston.

23-25 Interstate Oil Compact Commission, midyear meeting, Hotel Utah, Salt Lake City.

25-26 Western Petroleum Refiners Association, Mid-Continent regional technical-industrial relations meeting, Broadview Hotel, Wichita.

24-27 Canadian Gas Association, fifty-first annual meeting, Manoir Richelieu, Quebec.

28-July 2 Petroleum Equipment Suppliers Association, twenty-third annual meeting, Chateau Frontenac, Quebec.

**JULY**

23-26 Wyoming Geological Society, thirteenth annual field conference, Powder River basin.

**AUGUST**

11-14 Society of Automotive Engineers, National West Coast meeting, The Ambassador, Los Angeles.

25-27 Appalachian Gas Measurement Short Course, University of West Virginia, Morgantown, W. Va.

**SEPTEMBER**

10-12 National Petroleum Association, fifty-sixth annual meeting, Traymore Hotel, Atlantic City, N. J.

15-16 Independent Natural Gas Association of America, annual membership meeting, Roosevelt Hotel, New Orleans.

24-25 Western Petroleum Refiners Association, Rocky Mountain regional technical-industrial relations meeting, Henning Hotel, Casper, Wyo.

29-Oct. 3 Society of Automotive Engineers, national aeronautic meeting, aeronautic production forum, and aircraft engineering display, The Ambassador, Los Angeles.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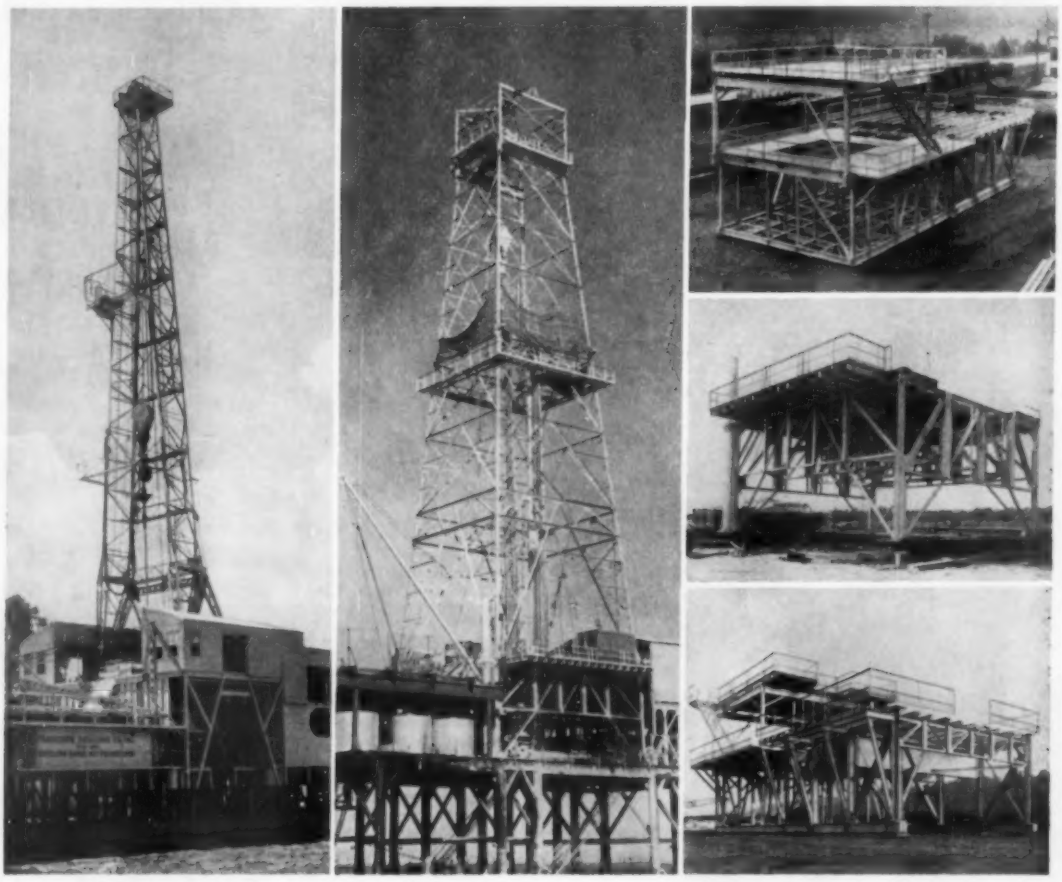

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the OIL AND GAS JOURNAL

TULSA, OKLAHOMA

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# JOURNALLY SPEAKING

## Man Wanted

ANYBODY SEEN this character? If so, notify the FBI at once. The map you save may be your own.

This is no joke.

This guy is Irwin Millner, and he is one of those indicted for conspiracy in stealing valuable geologic maps from Gulf Oil Corp. in Pittsburgh. The FBI has a warrant out for him for interstate transportation of stolen property.

The FBI has been looking for Millner for a year and a half but has been unable to find him in spite of the fact that he is 6 ft. 3 and weighs around 300.

So J. Edgar Hoover asked us to give his boys a hand. Very flattering and exciting, isn't it? But it's also very logical. You see, this fellow Millner is believed to circulate among people interested in the oil business. And if you wanted to get a message to people interested in the oil business, where would you go? Why, to the Big Yellow Book, of course, which (as our advertisers know so well) not only circulates among people interested in the oil business but also is very closely read by the most alert of them.

Here's the FBI's official description of him:

"Irwin Millner, alias Irving Millner, Irving Milner, Fred Miller. Born, March 8, 1908, St. Louis, Mo. Height, 6 ft. 3 in. Weight, reported variously as between 275 and 375 lb. Build, heavy. Hair, gray. Eyes, brown. Complexion, florid. Race, white, Nationality, American.

"Millner combs his hair straight back and has a clean-shaven, round face with double chin. He wears heavy rimmed glasses for reading and is said to have a very impressive personality.

"Reportedly, Millner has had considerable experience in the oil industry in the United States and Canada. He has participated in many oil promotion and drilling ventures in the past. He is able to converse with a great degree of intelligence and persuasiveness in this field."

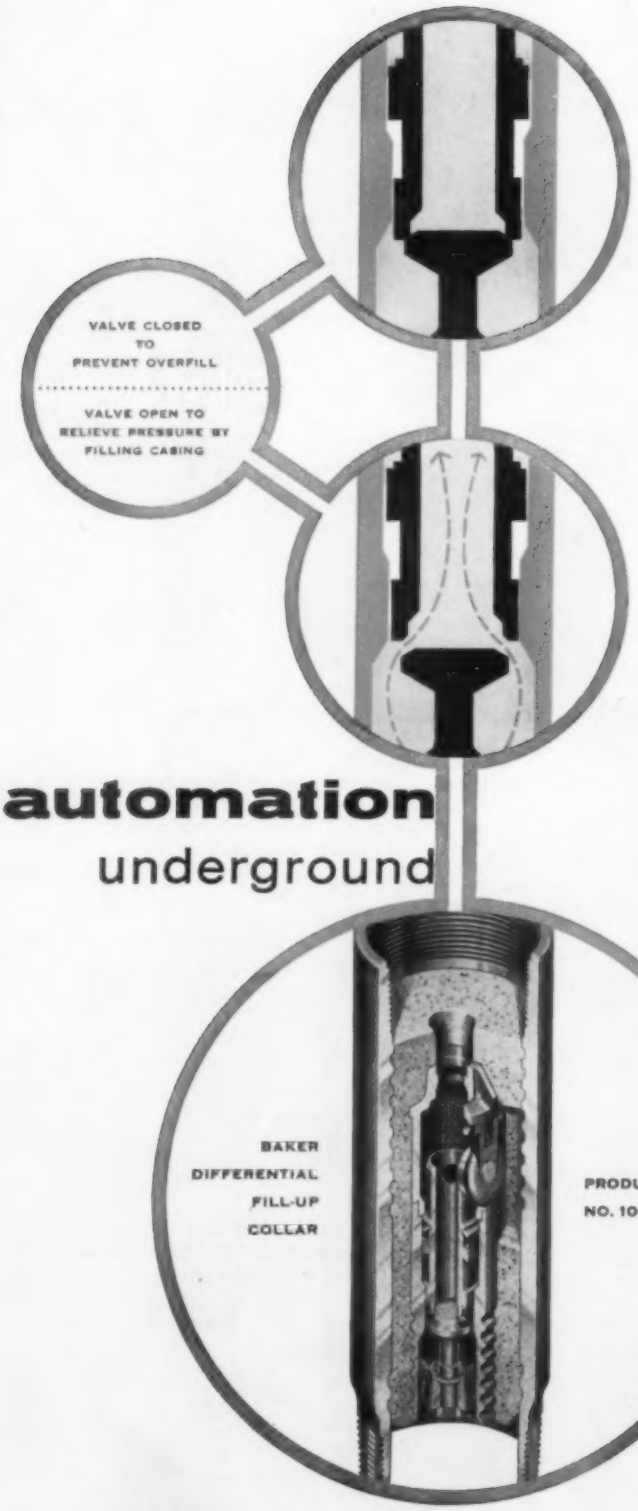
That's all we can tell you about Millner. He may have reduced, changed his name, dyed his hair, and grown a mustache. But the FBI thinks he is still trying to promote phony oil deals on the basis of the inside dope he got from Gulf's stolen maps.

So stop and recollect. Have you seen any tall, persuasive stranger circulating among oil men and talking up deals within recent months? Has anybody who could possibly meet this description visited your office lately? And if so, did you have your own maps and files securely locked up?

Anyone who can give any clues as to the whereabouts of this Millner is asked to phone the nearest FBI office. The number is listed on the first page of your local telephone directory.

Also, if you have hired any six-foot-three, gray-haired messenger boys in your map or reproduction department, better watch them closely. Millner may be on the prowl for more maps.

—*Henry D. Ralph.*




# automation underground

THE VARIABLE VALVE in Baker Differential FILL-UP Equipment is an amazing example of "down-hole" AUTOMATION. As a string of casing is lowered in the well, this valve AUTOMATICALLY takes into account the *weight and viscosity of the mud;* the *rate of lowering;* the *hydrostatic head* in the casing and in the annulus; and the *pressures* which tend to build up ahead of the descending, piston-like string of casing. Then, having *instantly* computed ALL these factors, the Variable Valve opens just enough to prevent pressure-surge build-up by permitting the casing to fill AUTOMATICALLY from the bottom up while it is being lowered. As the rate of lowering slows down (preparatory to adding another joint of casing) the pressure drops and the Variable Valve closes, thus maintaining the desired fill without overfill or overflow.

This AUTOMATION cycle is repeated each time a joint of casing is added and the string is lowered. There is no build-up of dangerous pressures which might cause lost circulation by breaking down weak formations—no mudded-off production zones—no stuck casing resulting from "no-motion" time while surface filling.

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Ask any Baker representative or office for Catalog Supplement #301, or arrange for Baker DIFFERENTIAL FILL-UP Equipment at your supply store.—**BAKER OIL TOOLS, INC.,** Houston, Los Angeles, New York.

# Crude prices should go up the same way they went down

THE extent to which scattered price cuts have whittled away at the crude-oil price structure is analyzed on page 53 of this issue.

About 30% of all U. S. production has been affected, the price cuts average out around 4%, and the average price of all crude has been pulled down about 1.3%.

Coupled with the lower production, this reduction in income is serious, but is not disastrous for the producing end of the industry as a whole. Many other industries are doubtless in worse position.

THE SIGNIFICANT THING about these price reductions is not so much their extent as their pattern. This is a buyers' market, and crude buyers could have slashed all prices "across the board." Instead, their cuts have generally been piecemeal and selective.

Refiners are in a cost squeeze. In times like this, and with crude overabundant, they have understandable reasons to select the types of crude they can process to best advantage and to price different crudes on the basis of the value of the products they can extract from them.

At present this makes a crazy-quilt pattern of price schedules. It is not likely to get simpler soon. In fact, there could be more of these spotty downward adjustments in crude values before this is over.

Unfortunately for producers, the current selective adjustments are all on the down side. Except for that, it is a good thing to move away from the extreme rigidity that has characterized crude prices for many years. With today's intricate refining processes and exacting product specifications it is unrealistic to hold that "crude is crude" and to expect any refiner to get the same values out of different grades.

WHEN THE UPTURN COMES, and something resembling a sellers' market returns, the same piecemeal, selective pattern of individual price adjustments should prevail as the general level of crude prices trends upward.

The industry will be much better off if there are no big, flat, across-the-board jumps in crude prices. Refiners can adjust to a rising market more easily. And there is little equity in hanging a premium price tag on a crude of low value in terms of products yield.

But the biggest advantage will be in public reaction. When all crude prices suddenly jump overnight, and products prices follow immediately, consumers and Congress get suspicious. They can't see any sense to it.

As a matter of fact, there isn't much sense to it. As market demand tightens, crude prices should inch up gradually, like most other commodities. And different crudes should get different amounts of increase in accordance with their individual intrinsic values to refiners.

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This new Lake Charles plant places an important source of cements for every oil-field job within immediate reach of the Gulf Coast oil industry.

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## Here's Where and How Crude Prices Have Changed

| State | Average Price Cut (Cents) | Volume of Crude (B/D) |
|---|---|---|
| TEXAS | | |
| North, West-Central | 7.86 | 129,400 |
| Gulf and South | 14.68 | 308,800 |
| West Sour | 27.07 | 14,500 |
| West Sweet‡ | 6.72 | 43,900 |
| Scurry County | 7.00 | 93,200 |
| Total Texas | *11.68 | 589,800 |
| LOUISIANA | | |
| Crude | 15.20 | 24,700 |
| Condensate† | 15.82 | 49,000 |
| Total Louisiana | *15.61 | 73,700 |
| OKLAHOMA | | |
| Southern | 10.00 | 151,700 |
| Sweet | 14.00 | 98,500 |
| Total Oklahoma | *11.57 | 250,200 |
| KANSAS | 15.00 | 60,000 |
| ILLINOIS BASIN | 15.00 | 305,000 |
| ARKANSAS | 10.00 | 80,000 |
| MICHIGAN | 22.00 | 25,000 |
| ROCKY MOUNTAINS | 8.00 | 60,000 |
| NORTH DAKOTA | 15.00 | 3,000 |
| CALIFORNIA | 11.50 | 450,000 |
| OHIO (Not Penn-Grade) | 16.60 | 12,000 |
| PENNSYLVANIA GRADE | 50.00 | 36,000 |
| GRAND TOTAL | *13.10 | 1,944,700 |

*Weighted averages reflecting actual volumes affected by each new cut.

†This involves actual postings for condensate which were cut. Not included in table is 130,000 bbl. daily of crude in Colorado, New Mexico, Texas, and Oklahoma put on a downward escalator scale for gravities above 44.9°.

‡Includes some Southeast New Mexico crude.

# Price Cuts Hit 29% of U. S. Output

• An extensive study by the Journal indicates the crude-price structure generally has firmed up. But some weak spots remain. The price of Oklahoma sweet is still unstable, and the Kansas picture has not jelled.

THE DOMESTIC OIL industry now has a clearer picture of what has happened to crude prices since October 1.

A detailed study of prices made by staff members of The Oil and Gas Journal with the help of major purchasers reveals that domestic producers in the last 6 months have seen:

. . . **At least 29.1%** of their crude suffer price cuts.

. . . **Price cuts range** from 5 to 50 cents a barrel.

. . . **Price cuts average** 13.10 cents a barrel.

. . . **Volume of oil affected** reaches 1,944,700 bbl. daily.

. . . **Loss of income** from lower prices tops $250,000 daily.

Actually, the volume of crude affected by cuts and the revenue loss of producers is slightly higher than these statistics indicate.

This is because some 130,000 bbl. daily of crude in Colorado, New Mexico, Texas, and Oklahoma has been placed on schedules calling for a 2-cent downward escalation for each gravity above 44.9°.

It's nearly impossible to estimate the exact volumes of crude moving at each of these higher gravities.

**How dismal is it? . . .** These price cuts, when taken as a whole, may not be as foreboding as they appear.

For instance, with crude over-all going at $3 a barrel, the average cut represents only a 4% loss of income per barrel. Since this loss is felt on only about 30% of production, it means a 1.2% loss in income for the nation's producers.

But percentages can be cold comfort to individual producers. Some have experienced stiff cuts on their entire production. In addition the cuts have come at a time when runs have been falling, thus compounding the individual loss.

The downward trend also worries producers. They well know how hard it is to get crude prices back up again. Their costs of finding new oil and producing it are not dropping. Many realize the cuts mean they are selling oil today for less than it'll cost them tomorrow to replace.

**What cuts show . . .** Pressure for the

cuts have come from domestic refiners who have been caught in a profit squeeze since the Suez crisis.

The squeeze arose from higher crude prices posted during the oil lift to Europe and subsequent softness of their products markets. Many companies report they have chalked up heavy losses in their refining operations in the last few months as a result.

Most crude buyers insist the cuts made so far have been attempts by refiners to put the crude they buy more nearly on a basis of its value to them in making products. They say this explains the jig-saw puzzle pattern of the cuts and why some crudes were cut and others escaped.

The same explanation is given for new price penalties being put on higher-gravity crudes and condensate. In these days of severe cracking and reforming to obtain superoctanes, the high-gravity charge stocks aren't as profitable as some of the heavier crudes.

In spite of this revaluing trend, oil pricing is still a jungle of schedules. Some companies will have as many as 12 or 15 different schedules. In some instances the same crude will be priced differently by different buyers.

Refiners and crude buyers hope ultimately a simplier price structure will emerge. The ideal, they say, would be one broad field price for crude of equal refining value with transportation costs to refining centers added. Few hazard a guess when this ever will be achieved.

**Where big cuts felt . . .** Texas generally felt the sharpest cuts—both in price and volume affected.

On the Gulf Coast and in South Texas, majority of the 308,800 bbl. daily feeling a cut got a 10-cent per barrel reduction. But a large enough volume of various select crudes were cut from 25 to 50 cents a barrel to send the average cut in Gulf-South Texas to 14.68 cents a barrel.

The 27.07-cent a barrel average cut on West Texas sour is explained by a 50-cent cut posted by Eastern States Petroleum Co. on 5,000 bbl. All of Scurry County crude took the 7-cent reduction as did the big bulk of West Texas sweet. About 14,000 bbl. daily of North and West-Central Texas crude went down 15 cents a barrel. The rest took the 7-cent cut.

California's reduction all came in heavier crudes. The cuts ranged from 2 to 20 cents but averaged 11.5 cents (OGJ, Apr. 21, p. 94). The cuts stemmed from oversupply caused by loss of Far East fuel-oil markets and loss of more and more domestic market to natural gas.

In Oklahoma, the southern section felt a 10-cent across the board reduction. This crude is predominately sour but some sweet also took the same cut because it is batched in pipeline with the sour. Bulk of cuts made on Oklahoma sweet have been 15 cents. Exception is 18,000 bbl. daily on which Magnolia Petroleum Co. posted only a 10-cent cut.

Louisiana crude cuts were 15 cents a barrel except for 500 bbl. daily on which a 25-cent cut was posted. The cuts on condensates ranged from 5 to 28 cents.

Price reductions in other states were uniform.

**How study made . . .** The effect of the price cuts was obtained from a study of more than 170 separate price changes posted from October 1 to late April.

The cuts had been made in such scattered areas that oil men generally had no idea of the volumes of crude affected in the aggregate. Many feared net effect of the selective price changes would be a general price break.

Journal staff members consolidated individual postings by areas, obtained the volumes involved in each cut, and ran the totals. The average price cuts were obtained by giving weight to the volume of oil affected by each change.

The relationship of the 1,944,700 bbl. affected by cuts during the period to national production was obtained by comparing it with the October-April average production of 6,690,000 bbl. daily. This revealed that 29.1% of domestic production was cut.

**Are cuts ended? . . .** Crude buyers believe that generally the crude market has stabilized.

Restricted allowables in the prorated states, production cutbacks in many other areas, and drop in refinery runs have all had a beneficial effect.

But several unstable areas still exist.

The price picture in Kansas still has not jelled. The 15-cent cut on 60,000 bbl. daily in that state came mostly within the last week or so. Anderson-Prichard Oil Corp. first posted the cut on 11,000 bbl. daily late in March. Three Kansas refiners met the lower price in mid-April. The major purchasers still have not moved.

Oklahoma sweet crude still is in a peculiar position. Cuts have been imposed on 98,500 bbl. daily but at least 150,000 bbl. daily taken by the state's major buyers is still going at the old price.

The buyers involved will do any cutting reluctantly, however. They say privately any change on such a large volume might disturb the prices of competing crudes, and strangely they are not out to beat down the prices on crude.

# 22.8-Cent Gas Price Approved

THE FEDERAL Power Commission last week tentatively accepted a 22.8-cent initial price in contracts under which more than 1 trillion cubic feet of gas will be dedicated to Southern Natural Gas Co.

But that price, said by the FPC to be "among the highest" in the South Louisiana fields from which the gas will come, will later be investigated as to its reasonableness.

The necessary sales certificates were issued to 11 independent producers at the same time as the commission approved Southern's plan to build 137 miles of 24 and 26-in. main line and 216 miles of supply lines to pick the gas up.

Total cost of Southern's project, which includes 4,310-hp. compressor capacity and 23 measuring stations, will be in excess of $39.7 million.

The new project, together with additions allowed by the FPC last month, will increase the company's South Louisiana supply system by 298,030 M.c.f. daily, the FPC said.

No plan for financing the project was offered by Southern, the FPC said, "although it has demonstrated its ability to induce capital investments in past construction projects." The company, therefore, is to submit a satisfactory financing plan before starting construction, it held.

**Rate settlement . . .** Southern Natural previously announced its expansion hinged on the ability to negotiate rate agreements with customers to comply with the Memphis decision (OGJ, Mar. 10, p. 100). This was the key to financing.

It has filed a plan to reduce the amount of a proposed rate increase by $7,152,200 per year. The substitute filing provides for an annual rate increase of $11,022,500.

The commission is agreeable to the result of Southern's proposed tariff, but will examine certain parts of the proposal at hearings later. The rate increase goes into effect but is subject to refund as it relates to one customer which did not agree to the revised tariff.

# Alaskan Land Rush Expected

**. . . as Interior gets ready to call for bids. Newly opened land is near Gubik gas field and big Richfield strike.**

THE INTERIOR Department is hopeful of touching off a new "gold rush" to Alaska.

More than 4 million acres in and around Gubik gas field in northern Alaska will shortly be opened for leasing.

Rules for lessees on southern Alaska's Kenai Moose Range and other wildlife areas will open 1,525 sq. miles of that reserve for development. Kenai Peninsula was the scene of Richfield's big discovery last year.

The opening of the Gubik field is the first step toward release of 20 million acres north of the Arctic Circle, reserved for the Navy for the past 15 years.

A 16,000-acre tract on the known structure of the field will be offered for competitive leasing in 640-acre blocks. Another 4 million acres outside the field will be available for noncompetitive leasing in 2,560-acre blocks.

Maps of the opened area will be issued by the department this week. The invitation for bids will go out at the same time or shortly thereafter. No lands within 2 miles of Naval Petroleum Reserve No. 4 will be included.

The oil industry will be given first chance at the released lands. But on September 1 they will also be opened to mining location.

**Wildlife rules . . .** Formal issuance of the rules for operations on wildlife lands will pave the way for the filing of lease offers on the Kenai range with the land office in Anchorage.

The new rules will cover game ranges in the states and so-called coordination lands as well as Alaska wildlife areas.

Lessees on such lands will have to agree to take various steps to safeguard wildlife. Specific rules are laid down for drilling operations.

These call for installation of adequate blowout prevention equipment; ring dikes and sump pits to confine drilling mud and other pollutants; safe disposition of salt water; covered flare pits; and removal of all equipment not needed for production within 60 days after completion of drilling.

Lessees will also have to agree to join in any unit plan required in the interest of conservation or the protection of wildlife.

The Alaskan area covered by these rules is the northern half of the 3,200-sq.-mile range along the eastern coast of Cook Inlet.

This is the same area where Richfield's Swanson River Unit discovery came in last September for 900 bbl. daily from an interval at 11,150-11,215 ft. Richfield drilled another successful well 2 miles south of the discovery. Another test is under way southwest of the two wells (OGJ, Apr. 7, p. 105).

**Gubik area . . .** The area in and around the Gubik gas field is part of the 25 million acres added to the 23 million-acre naval reserve. The Navy spent more than $45 million in a search for oil in the area.

The results were discovery of the gas field, with a reserve estimated at from 222 to 600 billion cubic feet of recoverable gas, and an oil field at Umiat with an estimated 37 to 75 million barrels of recoverable oil. Two oil and several gas fields of minor value also were found.

Modification of the 1943 order will keep the naval reserve intact and protect it by a buffer zone. Another five million acres will be set aside as a wildlife range. The lands lie above a line some 150 miles north of the Arctic Circle, mostly to the east and west of the naval area.

## National Supply, Armco Join

MERGER of National Supply Co. and Armco Steel Corp. becomes effective this week following overwhelming approval of the plan by stockholders of the two companies.

Under terms of the agreement, National Supply becomes a subsidiary of Armco. National Supply stockholders will receive 85/100 of a share of Armco common stock for each share of National Supply.

The merger will not affect personnel or policies, Armco Chairman Charles R. Hook announced. Armco, a steel producer, has more than 30,000 employes and sales of $777 million last year. National Supply, largest manufacturer of oil-field equipment in the world, has about 8,000 employes and had $300 million in sales in 1957.

## NPC May Still Operate

AN ACCEPTABLE arrangement for continuing the National Petroleum Council may be worked out shortly.

An NPC group headed by Chairman Walter S. Hallanan met last week with Atty. Gen. William P. Rogers and Interior Secretary Fred A. Seaton in an effort to settle the issues raised by Seaton last December.

The council has held no meetings this year because of unsettled interpretation of rules outlined by the Justice Department for the conduct of industry committees that advise government agencies. The major question is whether NPC shall operate under an industry chairman as in the past or with a government official at its head.

# Recession: Oil Men See a Silver Lining

**• Optimistic reports are coming from coast-to-coast. Speculation on when the recession will end vary all over the ball park, but most oil men agree that things will be better during the last half of the year.**

MOST OIL MEN are saying the same thing these days: Business isn't so good but it's showing some signs of reviving.

That may mean that oil men—traditionally optimists—are just whistling past the graveyard. But at any rate there are more people whistling an optimistic tune now than a few weeks ago.

And if psychology has anything to do with turning the economy upward, then this new-found optimism of oil men should help.

That was the general tone of comments picked up by The Oil and Gas Journal editors in a special survey of the oil industry last week. These editors interviewed economists, oil executives of major and independent companies, buyers, supply people, drilling men, producers, and bankers from New York to Houston to Los Angeles.

The newsmen sought answers to two big questions: What is the oil industry doing now to ride out the economic storm? What plans are being made to take advantage of the upturn when it comes?

## I. Cost Whacking

Economy and efficiency have become the watchwords in oil offices the country over.

Many younger workers, unfamiliar with the Spartan regimen of tight times, saw oil management cut down costs in a variety of ways: Expense accounts were reduced. Convention trips were restricted sharply. Company cars weren't traded in so soon, and tighter controls were imposed over their use. The economies were felt from top to bottom.

In personnel, new hirings halted. Pay raises became scarce. Layoffs were not widespread because the companies used limited early retirements, normal retirements, deaths, and resignations to cut the work force. What layoffs occurred were confined to some refineries, drilling crews, equipment manufacturers, and service companies.

Labor suddenly became more efficient. Turnovers in jobs dropped because workers stopped job jumping and started protecting the jobs they already had.

Oil companies also practically quit buying equipment and supplies. They were determined to use up heavy inventories piled up months ago when supplies, especially steel items, were tight. Up to now this has been an almost universal characteristic of the recession. It brought a sudden and drastic drop in the business of supply houses, equipment manufacturers, and many service firms.

## II. Major Cutbacks

The dramatic slashes in crude production and refinery runs are now familiar to nearly everyone. They were highlighted by 2 straight months of only 8 producing days in Texas.

Both of these actions by the industry also cut deep into the drilling and exploration activities in most of the country.

As one drilling contractor said: "What operator wants to drill a well in Texas with only 8 producing days. Wells that pay out in 2 years now will take 5. Only the large companies can drill and leave the oil in the ground."

Even most of the larger companies cut their drilling, a few by as much as 20% from 1957. In the first quarter, they centered domestic drilling on the necessary development wells and the more promising wildcats. Several who did not slice over-all drilling budgets diverted the funds into foreign drilling.

Active rotary rigs, as a result, hit a postwar low in late winter. Idle rigs were stacked. Some of the less efficient and poorly financed contractors went broke. Contractors as a whole also quit buying. If possible, many cannibalized idle or older rigs for parts to keep their other rigs operating.

Exploration efforts also were whittled. The action of one major was typical. It cut the number of geophysical crews in the field by 30%. Land acquisitions also were cut with the emphasis on buying better and higher priced properties. Development temporarily was cut in half, with wildcat drilling even cut more.

The refining segment of the industry also ran into trouble. Weak demand for refined products was aggravated by excessive product inventories and resulted in a sloppy market. Refiners took two steps in an attempt to halt their plunging profits: They cut down volume of crude runs to their plants and revised the prices they paid for crude in various parts of the country. (For effect of crude-price cuts, see p. 53.)

## III. Looking Ahead

Despite the impression which may be conveyed by all this tightening-up activity, the oil industry is not bankrupt.

As one oil man commented: "If we'd had the volume of business 5 years ago we have now, we would have thought it phenomenal."

One respected economist reported the current general recession stems mainly from widespread overbuying and overproducing. When these backlogs of goods are chopped down, the upturn will start.

This pattern aptly fits the oil industry. That's why the current tough industry actions to cut production, reduce refinery runs, live off inventories, and tighten up the purse strings ultimately will start lifting the oil business off bottom.

Signs are multiplying this may be beginning to happen. They are few, true, but they're widespread and persistent enough to be significant.

One major service company says signs of a slight drilling pickup are becoming obvious. Of its 15 divisions, 12 showed increased activity during the first half of April compared with the same period in March. This reverses many months of steady declines in business.

Most major companies agree drilling activity will pick up in the last half. Much of this drilling still will be the "must" wells or the better wildcats. Just how brisk this work will be is a disputed point. Indications are drilling for the year will fall far short of last year, and it could be 1960 before work is really humming again.

At least two bright spots appear in the drilling picture at the moment: The Rockies and the Ohio-Western Pennsylvania regions.

Drilling in the Rockies for the first quarter was higher than a year ago. Some oil men think even further increases will appear during the year.

## A Quick Look at Where the Industry Stands

✔ **DRILLING** has been extremely hard hit but shows signs of picking up now, especially in the Rocky Mountain region and the East where gas activity in Ohio and Pennsylvania is the hot trend. Don't expect drilling in Texas and the Mid-Continent areas really to gather steam until production cutbacks are eased.

✔ **EXPLORATION** activity is very selective these days. Companies are looking only at the better prospects, buying the better leases even if they are a little more expensive, and leaving the fringe prospects for study when times get better.

✔ **STOCKS** of crude are in a much better position. Gasoline is still in oversupply but should improve with the heavy motoring season approaching if refiners hew to the line on keeping down runs. Continued 8-day allowables in Texas soon will start pinching refiners and send them into the spot market for crude. Don't expect a real improvement in relation of supply and demand before the third quarter and then what happens will depend a lot on general business conditions.

✔ **BUYING** of equipment and supplies will start picking up some soon. Both company purchasing agents and supply salesmen agree oil-company inventories are dropping to the point where replacement buying soon will be needed. New buying pattern will develop, however. Purchases will be made nearer time supplies are needed. Heavy inventories will be avoided.

✔ **PERSONNEL** so far has fared pretty well. Layoffs have been confined to a few refineries, to equipment manufacturers, service companies, and drilling outfits. Companies have cut down hiring, knocked out overtime, but kept full staffs, letting resignations and retirements cut payrolls.

Big reasons: Gas areas opened up by the Pacific Northwest Pipeline and approaching expiration of many leases in the Denver basin.

Revived drilling in the East is due to gas exploration in the region bordering Lake Erie. Reports from that area indicate a busy summer is in prospect.

The picture in other areas is not rosy, particularly in Texas, where any real improvement will come only when demand rises and production gets off the present 8-day schedule.

But even in Texas the long downward slide in drilling may have stopped.

Three majors at least are maintaining normal drilling schedules this year in parts of Texas. Most of the others have cut back substantially, ranging from 10 to 30%. Independent operators have cut back even further. This is showing up in joint-interest deals with majors. They are down.

Low allowables are the big reason for the drilling slump. Operators just can't generate the capital from present production to sustain a drilling program of any size.

Operators think, however, the 8-day producing rate is having its good effect on the crude market, and allowables will start moving up before midyear.

The sales manager for an equipment manufacturer says the upturn actually will be detected in workover jobs before it is in drilling. When the Texas allowable gets back to about 12 days, he believes, there will be a mild boom in workovers.

Many wells now need working over, but operators are postponing the projects because they can make current allowables without strain. Even so this official reports well servicing and workovers have held up better than general drilling. This points up the desire of operators to limit investments to those with short payout rather than to long-range growth.

**Getting ready . . .** One independent said he had plenty of plans laid aside for better days.

Majors also have projects and programs temporarily suspended awaiting improved conditions.

These backlogs of jobs may give the industry a big lift when the upturn actually gets under way.

The independent explained his position this way: "We put most of our income right back to work. If production is off, we spend less by cutting back projects, delaying new drilling. When production is up, we automatically step up our spending."

Nearly all oil men are trying to keep their equipment in shape. Supply houses report sales of oil field surface production equipment has been running fairly good.

One California independent took this approach to the current doldrums. In spite of a 10% drop in his production, he plans to maintain development drilling at his 20-well annual level and in addition plans to modernize all his surface producing equipment.

The modernization project will involve 119 wells at a cost of about $100,000. He explains it's a good time to undertake an improvement program because steel items are easily available and dealers are in a mood to do business. He declared his company as a result hopes to be in a better position to take advantage of the increase in demand when it comes.

A Tulsa drilling contractor also reports now is a good time to modernize drilling equipment and put together new rigs. He has bought one rig from a major and is putting together a new one through trade-ins.

His reasoning: You can make good deals for equipment. Why not do it and put your operations on the most efficient basis possible.

This contractor isn't fooling himself. He knows the drilling business is real tough today—has been for several years and will continue to be. But he says the contractors being squeezed out now are the ones who didn't know their costs, made unrealistic bids, let their equipment go to junk, and as a result, became too inefficient to compete.

**A buying pickup . . .** This policy of maintaining and even improving equipment while at the same time not buying has put a big dent in oil-company warehouse inventories.

Purchasing agents for companies across the country give the tipoff that most of these inventories are nearing bottom. They'll be in the market again soon.

One Tulsa buyer commented: "We are still living off tubular-goods inventories, but we're getting down to

## Here's What Oil Men Are Saying About the Recession

**API executive:** "We're over the hump. With continued restraint and good business judgment we'll see a marked upturn within 90 or 150 days. We're seeing a turnabout already."

**Rocky Mountain operator:** "We've been more scared than hurt out here."

**Major-company officer:** "Some good has come out of the recession. Ninety-eight per cent of the men in our outfit have never seen a depression. It's been particularly good for young men who've joined us in the last 5 years. They've learned there has to be wise use of men and equipment. Those who couldn't learn that aren't with us any more."

**Rig manufacturer:** "When drilling does come back again, there'll first be a boom in repair and service work to put stacked rigs in operation."

**Supply-company executive:** "We're not pessimistic. We're just optimistic in a cautious way."

**Purchasing agent for major:** "We're still living off tubular-goods inventories, but we're getting down to the point where we're buying line pipe now when we need it. Drilling is bound to pick up in the third and fourth quarters and so will buying."

**Personnel chief:** "Our requirements for new technically trained people are off sharply. But we'll still visit a few colleges and hire a few, especially chemical and mechanical engineers. Our turnover in employes also is off. Workers just aren't leaving for greener pastures."

**Oil-country banker:** "We're still looking for oil-loan situations just like loans in other industries."

the point where we're buying line pipe now when we need it. Buying in general is improving—we weren't buying anything at this time last year. Drilling also is bound to pick up in the third and fourth quarters and with no inventories stacked up buying is bound to respond quickly."

Buyer for a New York based firm said: "We're at the bottom now. There will be a gradual stepup in our buying, although it certainly will be no spurt."

A Mid-Continent integrated company buyer had this to say: "Bread and butter purchases, such as surface pipe and tubing, are picking up more and more. We think drilling will pick up in the third quarter and that will mean more tubular-goods buying."

Mid-Continent division buyer for one of the big majors said: "We will definitely start buying more tubular goods in the last part of the second quarter. By that time our inventories will have been pulled down to the desired level. Since our drilling budget has not been cut, we'll have to buy."

One small independent company in Oklahoma reported its buying will spurt in midyear because of several new secondary-recovery projects now on the planning boards.

Some of the heaviest reductions in supply inventories apparently are occurring in Texas. Every major operator in the state reported he has lived off inventories for months.

One buyer for a major indicated his company plans very nearly to wipe out inventories of standard types of casing and tubing and then buy on an as-need basis. His comment: "We're not down to the bare walls yet —we still have some specialty items."

A California buyer reported: "We're still living out of our inventory except for some odd-sized pipe, but even so our dollar purchases for the first quarter of 1958 were higher than they were for the same time last year."

The Texas sales chief for a nationwide supply firm declared he expects oil-country buying to pick up some after midyear but won't really get started until around yearend. "Producers just aren't going to buy while they have inventories."

**New buying habits . . .** This new policy of paring down inventories to the bone and then buying only when a definite need arises is prompted by several factors. These include:

**. . . Desire to recover capital** tied up in supplies.

**. . . Need to reduce** current spending.

**. . . Habit of some cities** in slapping heavy ad valorem taxes on oil-company warehouse stocks.

**. . . Easy availability** of nearly all oil-field items.

There's no necessity for stockpiling items now because purchases can be made on a day-to-day basis even on pipe and tubular goods.

The pipe manufacturers and supply firms are moving to handle this type of buying by stocking goods at strategic points in the field. They formerly didn't do this and the large oil companies were almost forced to order direct from the mill.

Heavy manufacturer inventories of tubular goods are now accessible for purchase at Houston and Corpus Christi, Tex., and Vidalia and Harvey, La., and Kansas City. This is relieving both the oil companies and supply stores of the burden of heavy capital investment in steel-item inventories.

This development has occurred within the last 3 months. The steel companies lease land for a river terminal. The heavy supplies are barged in and stockpiled. The goods are trucked out from there to the purchaser's location, making the items available overnight in many cases and within only a few days at most.

Most supply men and company buyers report it may be a long time before oil companies maintain as heavy a stockpile of equipment and steel goods as they have since the war.

Nearly all companies have lowered their desired inventory levels. When that level is reached, they then buy to replace stocks. As a result oil-industry buying in the future will be more closely tied to the short-range projects the company knows it will undertake.

**What's ahead for people? . . .** New jobs in the oil industry are scarce at the moment, but most companies haven't abandoned recruiting plans completely.

Personnel men from the majors still plan visits to college campuses next year. Their hiring will be curtailed, will be more selective, and will favor engineers with chemical and mechanical training. Need for production and exploration technical men is off sharply, although officials believe this may be only temporary.

Since the industry hasn't drastically curtailed its research program, opportunities still exist for higher-degree holders or the young graduates with a bent for research.

Workers in the industry so far have fared pretty well during the downturn. Widespread pay cuts have been carefully avoided by oil companies. They have let normal attrition cut payrolls and have cut down on hirings. Also gone for the time being are most pay raises and overtime.

Naturally rumors of pay cuts and layoffs are rife in oil-company lounges and snack bars, but so far none have turned up on any large scale.

The fierce competition generated by the times has jolted the complacency of oil people from top management down. The day of the hard-sell and the hard-work has returned.

One supply-firm executive said his biggest job was keeping up morale of his salesmen. He is pushing them hard to step up customer contacts even though the salesman realizes his chances for immediate sales are scarce.

A story also is told about the chief executive officer of a major integrated company. He announced over the public-address system of the executives' dining room one day that he noticed all the executives appeared very well fed and well cared for. He wondered how they could find time to dine so heartily when they should be out in the field seeing how they could better serve customers or increase company efficiency.

The message struck home. Next day there was a great absence in the executive dining room. The hard-sell and hard-work movement took hold fast.

## IV. The Upturn: When?

One thing is nearly certain: No one knows when the oil business will get better.

But everyone you talk with has his own ideas. They range from an upturn in 90 days to nothing good before 1960.

All executives agree that general economic conditions affect the oil industry more keenly than formerly. They think any real improvement for oil will not come before a general business upturn. Some even say oil's improvement will lag the general upturn.

Most company executives are taking the cautious course in charting their company plans. They plan to maintain careful control over future expenditures with the idea that business will be down at least until some time next year.

The drilling-exploration executive in Texas for one major said it will take the oil industry until next year to get its supply-demand house in order, and no real improvement can come before that occurs.

Many others believe it's probable that oversupply can be corrected by some time in the third quarter and an expected pickup in demand then should start having beneficial effects. These men think that by yearend oil should be on its way up.

The more optimistic school of thought predicts we've hit bottom in April and within 90 days the industry will head out of the woods.

But no matter when better days come, oil men generally feel optimistic they're taking the right steps now in holding down production, refinery runs, and protecting their cash strength by economizing to the bone.

**Kenneth B. Barnes**
. . . elevated to vice president.

**George H. Weber**
. . . the Journal's new editor.

# Journal Promotes Two Editors

A CHANGE in the two top editorial positions at The Oil and Gas Journal has been announced by P. C. Lauinger, president of the Journal.

Kenneth B. Barnes, editor since 1952, has been named vice president and editorial director, a new position. Barnes will be succeeded as editor by George H. Weber, the Journal's refining editor. The changes will be effective June 1.

Lauinger explained that the new vice presidency was created in order to meet the Journal's expanding editorial program. In his new post, Barnes will direct many of the special projects carried out by the Journal.

Both Barnes and Weber are widely known throughout the international petroleum industry and are veteran members of the Journal's staff. Both also are petroleum engineering graduates of the University of Oklahoma. Barnes received his degree in 1930 and Weber in 1935.

The two editors have had many years of technical reporting experience.

Before serving as editor, Barnes was managing editor of the Journal for several years. His assignments have taken him to most of the oil-producing areas of the world. Barnes was with Cities Service Oil Co., Continental Oil Co., and Gulf Oil Corp. before joining the Journal. He also is a former member of the faculties of Penn State University and the University of Tulsa.

Weber is regarded as one of the best-informed editors in the industry. In addition to his experience as refining editor, he represented the Journal for several years as a district editor in the oil-producing areas of Louisiana and Texas. Weber joined the Journal shortly after graduating from Oklahoma University.

Weber will move to the Journal's Tulsa headquarters about June 1.

# Imports Exceed Quotas

**. . . in March and are expected to be high again in April. Short notice on new quotas blamed for excessive imports.**

A SHARP INCREASE in crude imports in March will be shown in figures soon to be released by the Government.

The average for the month may be in the range of 835,000 to 840,000 bbl. daily, against only 670,300 bbl. daily in February. The recommended level, under the volunary import program, was 771,400 bbl. daily.

April imports also will be high. But present indications are that they may be as much as 75,000 to 80,000 bbl. per day less than in March.

April's receipts are seen as running around 750,000 to 765,000 bbl. daily. That will be well above the new quota of 713,000 bbl. daily set in the revised program of the cabinet committee last month.

One reason for the excess: Importers had only a few days notice of quota cuts. And it takes time to revise tanker and operating schedules.

The March imports were close to the estimate filed by importers in February with Capt. M. V. Carson, Jr., program administrator. April receipts will be well under the estimate, though above the new quota.

Importers in February, forecast receipts of 837,500 bbl. daily for March and 799,300 bbl. daily for April.

As yet, importers, faced with the need to cut back still further, have filed no estimates of what they will import in May or later months.

**Maneuvers . . .** There are reports the sharp cuts in imports have led to special deals for additional foreign crude.

East Coast refiners whose plants must use a large volume of foreign oil to remain competitive are reported taking crude from other importers. In some cases, this is done by exchanges for domestic oil. But there also may be some outright buys of the imported oil.

Such deals are perfectly legal as long as all the foreign oil involved is imported in compliance with the program, government officials say.

The Defense Department, meanwhile, is struggling with another phase of the import problem.

The loosely-worded executive order issued from the White House March 27 so amended the Buy American Act that military purchasing may be seriously impeded if the order is not changed.

Officials cite two areas in which this is the case:

. . . **The ban on government awards** to importers who did not stay within their quotas through the 3 months prior to the submission of bids could rule out companies which are important suppliers to the armed forces.

. . . **While a price differential** will be applied to bids on military supplies submitted by foreign refiners and domestic refiners, the order does not spell out what the differential will be. The order provides for no price differential at all on bids submitted on products supplied from domestic crude or legally imported foreign crude.

Defense officials would like to have the compliance requirements changed. They would like to drop certification of past compliance and rely entirely on the agreement of contractors that they will comply with the import program during the life of the contract.

They also would like a more definite instruction on the differential to be applied to bids of foreign refiners.

**The target . . .** The pressure from domestic oil interests for tightening of the Buy American Act has been directed at purchases of jet fuel and other products from Caribbean refiners rather than those from domestic companies refining foreign crude.

The problem of the differential might be settled by a department order. But defense officials may have to ask for revision of the executive order to solve the compliance problem.

An "out" in the order, allowing the award of contracts to noncomplying importers if they offer products made wholly from domestic crude, is said to be worthless. No East Coast refiner, it is pointed out, could possibly offer such products.

## Looping Program Contracted

GULF INTERSTATE Gas Co. has awarded contracts to Houston Contracting Co. for the major share of the company's 30-in. looping program this year.

Houston will lay 216 miles of 30-in. in Louisiana, Mississippi, and Tennessee. Right-of-way work for two spreads will start June 1 and pipe laying about June 15. A third spread may be added later.

Gulf Interstate's total program of 351.7 miles of 30-in. mainline loops and 54 miles of 24-in. lateral-line loops will increase capacity of the system by 91,000 M.c.f. daily. By next winter the company will be able to deliver 666,100 M.c.f. daily from Louisiana to West Virginia to United Fuel Gas Co., its sole customer.

# Lube Capacity Up

**despite lower demand last year, NPA report shows.**

FINISHED-LUBE-OIL capacity of U. S. refineries edged upward in 1957 despite a decline in demand for products.

Capacity at the end of the year was 185,810 bbl. against 181,170 bbl. at the end of 1956, according to the annual review of the National Petroleum Association.

Solvent dewaxing, solvent extraction, and propane deasphalting capacity all increased. Solvent dewaxing climbed 11,335 bbl., up about 8%. Solvent extraction capacity increased 5,885 bbl., about 2½%, and propane deasphalting, 3,800 bbl., or about 5%.

Here are the major changes:

. . . **Cit-Con Corp.,** Lake Charles, La., increased solvent extraction capacity 2,000 bbl. to 28,000 bbl. and finished lube capacity 1,000 bbl. to 10,000 bbl.

. . . **Esso Standard Oil Co.,** Baton Rouge, La., increased solvent extraction capacity 300 bbl. to 14,300 bbl.; solvent dewaxing 4,800 bbl. to 15,000 bbl.; propane dewaxing 100 bbl. to 4,100 bbl.; and finished lube capacity 1,000 bbl. to 10,000 bbl.

. . . **Humble Oil & Refining Co.,** Baytown, Tex., increased solvent dewaxing 3,000 bbl. to 12,500 bbl.; propane deasphalting 300 bbl. to 7,000 bbl.; and finished lube capacity 2,900 bbl. to 18,500 bbl.

. . . **Shell Oil Co.,** Houston, increased solvent extraction 900 bbl. to 8,500 bbl.; solvent dewaxing 400 bbl. to 5,900 bbl.; and finished lube capacity 400 bbl. to 4,000 bbl.

. . . **The Texas Co.,** Port Arthur, increased solvent dewaxing 1,000 bbl. to 12,000 bbl. and finished lube capacity 1,000 bbl. to 17,000 bbl.

Ranking lube manufacturers are Humble, Baytown, 18,000 bbl.; Texaco, Port Arthur, 17,000 bbl.; Gulf Oil Corp., Port Arthur, 13,000 bbl.; Sun Oil Co., Marcus Hook, 11,800 bbl.; and Standard Oil Co. of California, Cit-Con, and Esso Standard, each 10,000 bbl.

## Test Nears Record

### depth in Texas. Pecos well whipstocks at 21,450 ft.

PHILLIPS Petroleum Co.'s Pecos County deep test has staged a comeback and is again threatening to break the Texas, and possibly the world, deep-drilling records.

The company's 1-EE University at midweek had reached 21,450 ft. on its projected 23,000-ft. contract. At that depth it was just 237 ft. shy of the Texas depth record set by Pan American Petroleum Corp.'s 1-CS University last year only 7 miles to the southeast. The Phillips well is located 9 miles southwest of Baldridge, Tex.

It first threatened the state record last February when it reached 21,396 ft. A hopeless fishing job developed when the drill string parted at that point. Phillips was forced to carry out what is believed to be the deepest whipstock operation ever attempted, moving back up the hole above the top of the fish at 19,986 ft. Operator since has been drilling to make up the lost hole.

If the 1-EE University succeeds in reaching its projected 23,000-ft. depth, it will have broken the world's drilling-depth record by nearly 500 ft. The current drilling champion was drilled to 22,570 ft. in South Louisiana by Richardson & Bass and others.

## Humble Closes Unit

### at Baytown refinery because of low butadiene demand.

HUMBLE Oil & Refining Co. has shut down the butadiene unit at its Baytown, Tex., refinery for an "indefinite period."

The decision was attributed to "the continuing low demand for butadiene as an ingredient in synthetic rubber and other chemical uses."

Before the shutdown the unit had been operating at only about 15% of its 65,000 tons per year capacity.

"It is now expected that butadiene demand will increase in the latter part of the year so that production can be resumed late in 1958," a company spokesman announced.

Humble plans to use part of the plant's equipment "to demonstrate its ability to produce small quantities of other chemical raw materials which may have good potential sales outlets in the future." This phase of the operation is expected to be discontinued early in June, however.

## watching WASHINGTON

**. . . with Bertram F. Linz**

### ● Oil holds price line well

THE OIL INDUSTRY is credited by a government agency with doing much to hold its price line in this era of rising costs.

The Census Bureau, surveying 142 industries, found that the "value added by manufacture" is less in oil refining than in 125 other activities. And most of the industries are much smaller then the oil industry.

The value added by manufacture is the difference between the cost of raw materials, supplies, fuel, and power, and the price of products at the plant gate.

The automobile industry tops the list, followed by steel mills, aircraft plants, and organic chemical makers.

Petroleum products in 1956 stood in 126th place. In 1947 it was 115th. In the next decade 11 other industries jumped ahead as oil dropped to 123rd place in 1954 and again to 125th the next year.

### ● U. S. softens to world oil plan

THE U. S. MAY BE ON THE VERGE of dropping its long opposition to international commodity-stabilization agreements.

More than a decade ago, the Government bitterly fought a suggestion for a world-wide oil agreement.

Today, there are indications the Government is ready at least to discuss such a scheme on a limited scale. It might, for instance, talk about an informal arrangement on oil with Canada and Venezuela.

The basic idea is to find a way of easing the effect on foreign countries of U. S. declines in price and use of raw materials they supply.

It was on this basis of "cooperation" that Canada and Venezuela were advised in advance of our plans to restrict oil imports, Secretary of State Dulles reveals.

Those talks, Dulles said, indicate "a willingness to have this problem handled in some kind of a cooperative way—mutually acceptable to the producers in this country, I hope, and also to producers abroad."

Several years would be needed to work out such a plan, informed sources say. Venezuela would first have to adopt a conservation policy, it was pointed out.

### ● Nations fuss over sea boundary

THE OLD 3-MILE LIMIT may be on the way out. But probably not yet.

What the new sea boundary will be is undecided. It's the subject of a hot fight among 86 nations meeting in Geneva. Chances are no agreement will be reached.

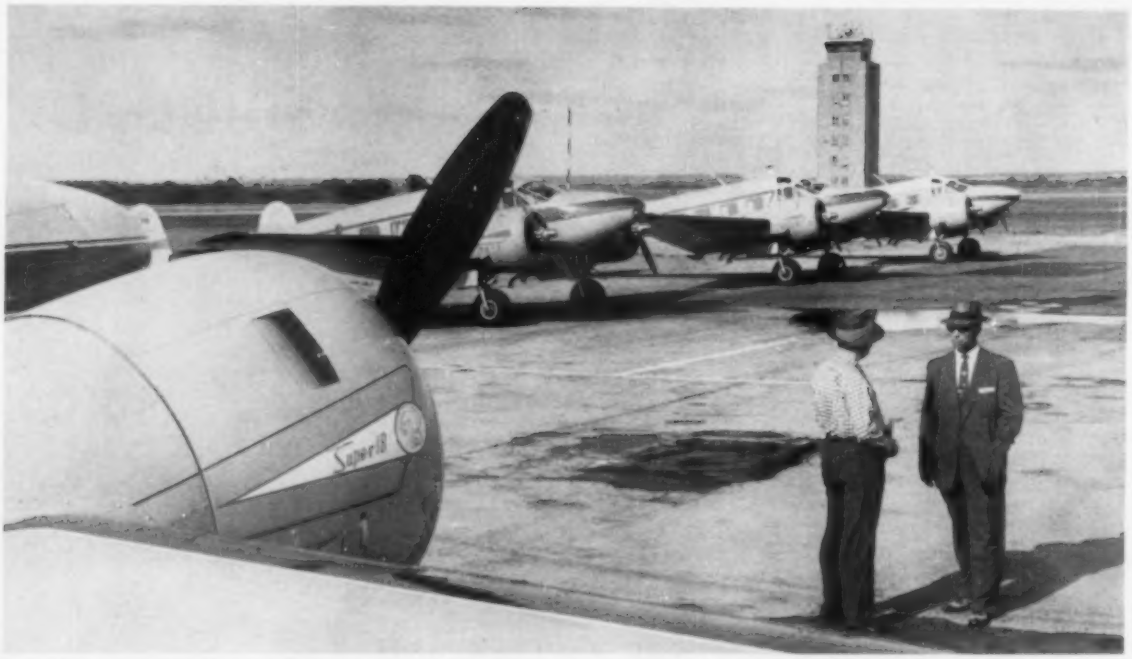
The U. S. wants to keep the present limit. So would Canada—if the exclusive right to fish ran to a 12-mile line.

The USSR, however, demanded a 12-mile zone. Small countries fell in with this, eager to protect their shores in case of war and save the fishing for themselves.

Great Britain tried to compromise the issue on a 6-mile boundary. This was turned down. The latest move, by the U. S., would set up a 6-mile territorial sea, with fishing rights extending another 6 miles.

There's little chance that any agreement will be reached. But if new national boundaries are set up, one thing is sure: Whatever it is, it will have no effect on the hassle between the federal Government and the gulf states over whether their seaward line is 3 miles or 3 leagues.

Justice Department officials say the issue isn't what the boundary is now, but what it was when the gulf states came into the union.



**SPEED**, safety, and efficiency are watchwords for Sunray Mid-Continent's five-plane air fleet, shown here at Tulsa Municipal Airport. In 13 years, not a plane nor passenger has been scratched. More important management has found . . .

# Air Fleet Is Saving Money for Sunray

IT'S NO ACCIDENT that Sunray Mid-Continent Oil Co. has flown its air fleet 13 years without an accident and still has saved travel money to boot.

The men who manage and fly Sunray's planes planned it that way.

Sunray's fleet—five twin-motored craft—actually is small by comparison with the 20 and 25-ship fleets of several other major oil companies.

But its fleet is distinctive. The number of planes is geared closely to the company's needs. The fleet is operated on a formula of good equipment, good men, and strict rules for safety, maintenance, and scheduling.

And the efficiency achieved goes far to disprove the undeserved reputation the oil industry has received for wasteful use of its airplanes.

**The right plane . . .** In the case of Sunray and every other oil company involved in an air fleet, efficiency starts with the purchase of the plane.

Herman Arnspiger, veteran chief pilot and manager of Sunray's aviation department, says his company has settled on medium-sized twin-engine planes as best fitting its needs. The fleet consists of a Lockheed Lodestar and four Beechcraft Super 18's.

The Lodestar has a nine-passenger capacity, and the Beechcraft Super 18's carry five passengers.

Arnspiger reports the investment in these heavier planes actually pays off in Sunray's case. Their operating costs are almost identical with some lighter models. But for the same flying time and operating costs the larger ships will pick up many extra miles. These extra miles actually cost nothing and in a year's time become a sizable item.

The heavier planes also offer safety and comfort factors that make them attractive.

Sunray's air fleet is used primarily in flying personnel on business trips—freight cargoes alone are hauled only in emergencies. Passengers are usually management-level men who need to get from the company's Tulsa headquarters out to district offices or field location in a hurry. These men will average flying more than 3,000 hours a year to every section of the country and some parts of Canada.

With so much valuable executive talent using the fleet, safety is a paramount consideration. Besides, buying craft that will fly all weather and accommodate a 2-man crew on every trip, the Sunray planes are loaded with all the necessary safety equipment and aids.

This investment is another example of the Arnspiger emphasis on getting every Sunray passenger back home safely.

**Staff of good men . . .** Core of this emphasis on safety is the pilots and mechanics who operate the Sunray fleet.

Sunray pilots are a hand picked group of flyers. They are experienced men before they are hired. Many have better than 4,000 hours logged flying time with 1,000 hours handling multiengine craft.

Arnspiger says these men have to be versatile pilots, able to fly anywhere. "We have no copilots, just seniors and seconds," Arnspiger says. "Each senior pilot is assigned a Super 18, while second pilots rotate on all equipment."

Arnspiger and his assistant chief pilot, W. C. Schulle, take turns on the Lodestar, which is usually reserved for long trips or flights having more than five passengers.

No matter how short the trip, each Sunray plane is manned by two pilots. Senior and second pilots share flying duties equally. They will alternate between left and right seats. One will fly out, the other home.

This policy keeps pilot efficiency high and stimulates morale. Also on any deadhead trips, pilots use the

# Planes Rated as Valuable Tool

THE OIL INDUSTRY has achieved an undeserved reputation for profligate use of company planes.

It has prompted some oil management to study the question: Are planes justified? Are they being misused?

Critics have levelled the accusation loosely at the industry as a whole. Most often what they're criticizing is how an individual uses his private plane. Or they see an oil-company plane near some resort area and assume the ship is engaged solely in a pleasure junket.

Many independent oil men do have planes. They use them like many other people use automobiles—both for business and pleasure. But many other successful men also own planes and fly them on pleasure trips without arousing any suspicious comments. This prompted individual oil men contacted by the Journal to ask: "Why are we singled out?"

As for oil-company use of planes, the Journal has found management of companies operating air fleets very cost conscious and careful to be sure that fleets are run efficiently and for the company's interests. The Sunray aviation story told on these pages is an example.

The officials—both in large and small firms—all declared the airplane is a vital management tool and essential to an oil company with operations in remote areas of the country.

Essentially the plane saves time of highly paid men and allows them to do more work than would be possible if they were chained to slower means of transport. Planes also move personnel and materials quickly to remote places for unusual jobs. In short, aviation has been a godsend to oil companies.

The exploration vice president of one major company flatly declared he couldn't perform the present job his management expected of him without an airplane. His management domain extends from Canada to offshore areas in the Gulf of Mexico and included the West Coast and Rockies.

Without plane service, he explained his company would have had to decentralize its operations further and management would be saddled with slower moving communications in making decisions or taking action.

The drilling chief of another company reported just one instance in his experience proved the value of planes to his company. By being able to fly an expert with the right equipment a long distance to an offshore well in trouble, a multimillion dollar investment was saved. That one flight alone, according to the official, paid for the company's fleet that year.

Other such stories are numberless.

Oil men all feel justified in making the investment in planes and personnel to operate them. But they aren't kidding themselves. They know air fleets are expensive. Their chief concern now is seeing that the right type of equipment is bought and that it is used efficiently.

time by hooding the ship and flying blind or making instrument approaches.

Pilot efficiency is kept razor sharp in other ways. Each pilot must spend a minimum of 5 hours monthly on the Link trainer. He stands an instrument check every 6 months. In addition, periodic flying and physical checks are made. The men never gamble with their efficiency.

Similar care is taken with the crew of mechanics to keep the planes in safe flying trim. The four mechanics all hold CAA aircraft and engine mechanic licenses. Each has between 12 and 15 years experience in aircraft mechanical work.

**Strict rules . . .** Sunray crews operate as an efficient team under a hard set of rules covering:

. . . **Safety.**

The pilot is always the boss on a flight. He says whether the weather is too bad to fly. An executive of the company—no matter how highly placed—cannot push the pilot out into weather he considers unsafe.

Planes don't fly foul weather involving line squalls, low ceilings, or icing conditions. Flights normally are limited to daylight hours. Landings are made only on good fields. Sod runways are used only if they are dry and at least 3,000 ft. long.

A CAA flight plan is filed for every trip. All flying is made as if instrument-flight conditions prevailed no matter what the weather. Pilots make position reports en route. These enable the company to contact a flight in case it is necessary to divert the plane to a new destination.

Arnspiger insists the pilots keep abreast of all phases of flying. They must make thorough studies of weather en route and know their own personal limitations and the limitations of their planes.

At destination, crews service the aircraft immediately after landing so the plane will be ready for a prompt return trip.

. . . **Maintenance.**

A plane also is checked after every flight before it takes to the air again. The pilot makes a performance report on his ship which serves as a guide to the mechanics.

Sunray leases hangar, office, and shop facilities from Spartan Aircraft Co. at Tulsa Municipal Airport. Spartan furnishes all ground handling, radio, and major overhaul services. Sunray mechanics do all other routine maintenance.

The Sunray maintenance staff keeps spare engines and other parts ready to install quickly on the planes in case of trouble. Repairs are then made in the shop without holding up a flight.

. . . **Scheduling.**

Requests for flight space or trips are centered in the office of the secretary to Sunray President W. C. Whaley. They are consolidated as far as possible before being transmitted to Arnspiger, who actually schedules the flights.

The minimum passenger load for a flight is two, and every care is taken to have the maximum passenger load for the flight.

. . . **Control of costs,** repairs, trips.

The pilot makes a report after each flight, and Arnspiger compiles a monthly report on each plane. It gives the hours flown, miles, number of flights, average speed, gas and oil used, storage fees, office and shop rental, Spartan's billing for services, and miscellaneous items accrued during the month.

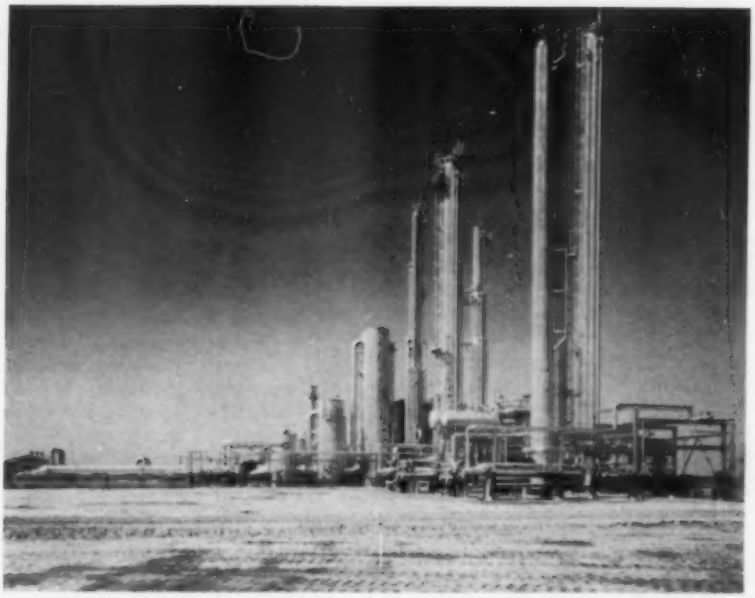
This permits Arnspiger to know his cost breakdown to the penny.

When Arnspiger started Sunray's aviation department in 1945, he told officials he could cut transportation costs and save valuable time also. He apparently proved his point for one company executive reported recently: "Our flight operations in the past few years have saved us more money than any other department."

## California Gas Line Planned

PACIFIC LIGHTING Gas Supply Co. has filed application with the California Public Utilities Commission for authority to build a 128-mile, 34-in. natural-gas line from Topock to Newberry, Calif.

The line will tie in at Topock, on the Arizona-California border, with Transwestern Pipeline Co.'s 1,300-mile line planned from West Texas to California (OGJ, Apr. 21, p. 100).



**PIPELINE GAS** will be processed at Eunice, La., where a . . .

# Big Extraction Plant Is Built

A NEW gas processing plant, one of the largest in the U. S., was dedicated officially last week near Eunice, La.

The Eunice extraction plant, with a capacity of 300 million cubic feet per day, is designed especially to process pipeline gas from the adjacent line of Texas Gas Transmission Corp. As such, it joins a growing parade of plants which extract liquid hydrocarbons from the many field gas streams feeding the main transmission line.

The new plant is owned jointly by Runnels Gas Products Corp., a wholly owned subsidiary of Union Oil & Gas Corp. of Louisiana, and Texas Gas Exploration Corp. Runnels will operate the plant, which was designed and built by Fluor Corp., Ltd.

In size it is among the top 15 of the 544 gasoline and cycling plants in the U. S.

The plant will recover a healthy 5,000 bbl. per day of products from its designed throughput of gas.

Normally, natural-gasoline plants will process gas from the larger fields before it enters the transmission system. Also field separation plants are becoming commonplace in the smaller fields. However, there are enough liquids left in the gas from these plants and also from unprocessed wet gas streams to make a large volume plant on a big pipeline a practicality.

The Eunice plant is a low-temperature unit designed to extract 95% of the propane, 99% of the butanes, and essentially all of the natural gasoline in the gas stream. Product breakdown is 2,450 bbl. propane, 650 bbl. isobutane, 550 bbl. normal butane, and 1,350 bbl. gasoline.

# Tidewater Test Hits

## in Louisiana, indicating big gas-condensate discovery.

A NEW FIELD being opened by Tidewater Oil Co. in southern St. Landry Parish, South Louisiana, is giving indications of being a major gas-condensate discovery.

The discovery well, completed last week, is productive from two Cockfield-Sparta horizons, one at 10,380-94 ft. and the other at 10,548-50 ft.

Tested through 5/32-in. chokes, it flowed at the rate of 1,600 M.c.f. of gas per day from the upper zone, and 1,650 M.c.f. per day from the lower. Flowing pressures were 3,700 psi. and 2,435 psi., respectively.

Liquid recovery per 1,000 M.c.f. was 20 bbl. of 37°-gravity condensate from the upper zone, and 40 bbl. of 58°-gravity condensate from the lower. The well is shut in pending provision of market outlet for the gas.

Location, in the Popular Grove community, is 3 miles southwest of Port Barre, and about 2 miles east of East Opelousas gas field, nearest production. It is on Tidewater's 1,320-acre Haas lease in a lease block totaling 3,000 acres.

# ——*Processing* briefs

**Husky Oil Co., Cody, Wyo., has** leased a char plant at Red Lodge, Mont., for 1 year for research in carbonization and petrochemicals. Husky also holds an option to purchase the plant at the end of the year for $450,000. Koal Crudes, Inc., Spokane, Wash., put the plant up for lease after it was shut down more than 2 months ago for lack of capital. Dr. C. C. Crawford will direct research at the plant for Husky.

**A new method for extracting porphyrins** from crude oil and measuring them rapidly has been developed by researchers of Standard Oil Co. (Ind.). Dr. John Sanik, Jr., research scientist for Indiana Standard, described the technique at the American Chemical Society meeting at San Francisco.

**Aurora Gasoline Co. soon will install** an 18,000-bbl. vacuum unit at its 47,000-bbl. refinery at Detroit, Mich. Refinery Engineering Co., Tulsa, has the contract for design, engineering, and construction. The unit is scheduled for completion in early 1959.

**Boilers capable of generating steam** efficiently by burning low-volatile char have been developed by Babcock & Wilcox Co. thereby making it possible to use low-cost fuel for power production. Char is a fine, coke-like residue remaining after tars and chemicals have been extracted from raw coal. Three char-burning units installed at the Ohio Power Co. plant at Cresap, W. Va., will have a design pressure of 2,400 psi. steam and reheat steam temperatures of 1,050° F. and a combined output of 4,569,000 lb. per hour.

## *Also for Refiners . . .*

**IN THE NEWS:** Crude-price cuts since October have averaged 13.10 cents and affected 29.1% of U. S. production, a Journal survey reveals (p. 53) . . . More oil men are optimistic about an upturn, Journal editors find in talking to operators and executives over the country (p. 56) . . . Volume of imports shows increase for March (p. 60) . . . One of the world's largest gas-processing plants dedicated at Eunice, La. (p. 64).

**PLUS THESE TECHNICAL REPORTS:** Vapor-lock control vs. ease in engine starting (p. 85) . . . Better lubrication at lower cost (p. 101).

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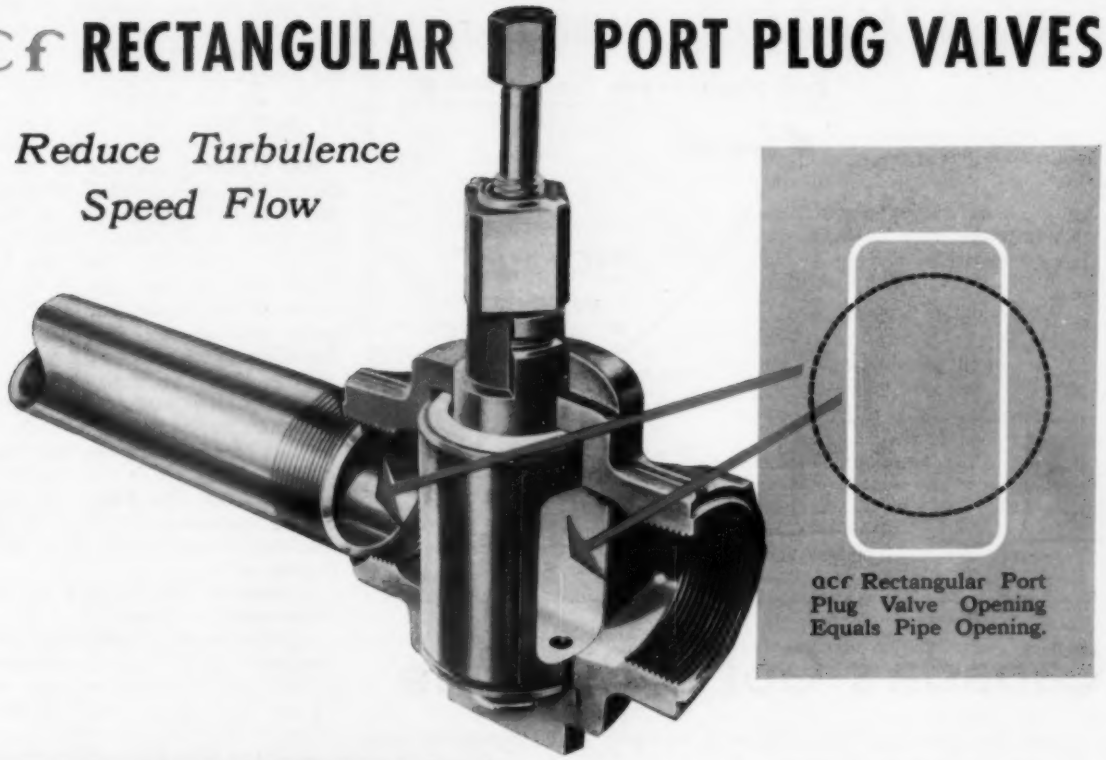

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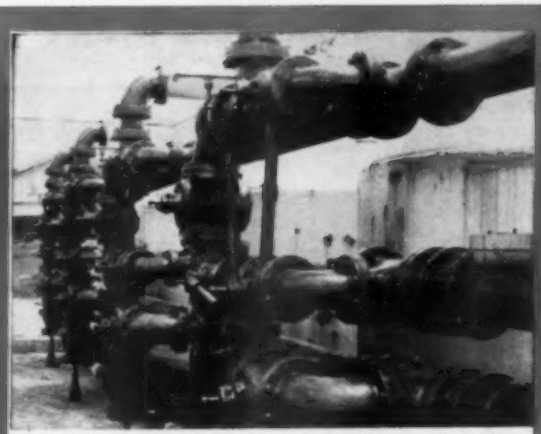

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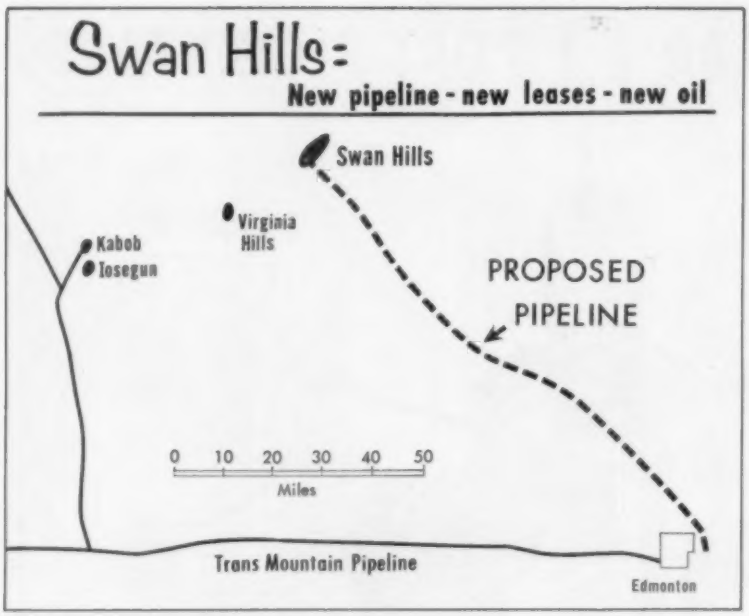


# Canada's Got a Big One

**. . . in north-central Alberta, where developments are proving the Swan Hills region to be a comer. Lease sale brings in $16.8 million.**

THREE major developments have mushroomed Alberta's Swan Hills region into contention as one of Canada's major oil provinces.

Here's what has happened:

**. . . Home Oil Co., Ltd.,** will build a 130-mile crude pipeline southeast to Edmonton.

**. . . Home Oil** disclosed it has four more producers in the area.

**. . . High bidders** on leases paid $11,880,000 in bonus money to show their confidence in the future of the Swan Hills region.

Announcement of the pipeline and the new oil strikes stemmed directly from the lease sale. Home Oil, a major Canadian independent, waited until after it got the lion's share of the leases before turning loose the information.

Federated Pipe Lines, Ltd., Calgary, a wholly owned subsidiary of Home Oil, will build the pipeline at a cost of about $6.5 million. The Alberta government has approved the line, and construction is expected to start this spring on the southern end.

The 10¾-in. line will have an initial capacity of 30,340 bbl. daily with one pumping station. This could be raised to 40,800 bbl. with the addition of a booster station.

It was understood that Regent Refining (Canada), Ltd., a subsidiary of McColl-Frontenac Oil Co., Ltd., may later participate with Federated in the line.

**The tie-in . . .** Construction of the pipeline will give Home Oil an outlet for its huge new producing potential in the Swan Hills region.

Until the latest lease sale was completed, the company kept secret the fact that it has four more producers.

These four, along with the Swan Hills discovery well itself and one other stepout, give Home Oil six successes from the Slave Point of the Middle Devonian.

Of the four new wells, the most interesting is a 3-mile stepout, Home et al 10-10-67-10 Swan Hills. It has indicated a net pay sector of between 100 ft. and 125 ft. It topped the Beaverhill Lake-Slave Point at 8,160 ft. at an elevation 12 ft. higher than any well so far drilled in the area.

The other three producers in the same vicinity are the Home Regent et al 10-13, 10-29, and 10-30 Swan Hills.

The 10-13 shows a net pay sector of 35 ft. at present, the 10-29 a pay sector of 110 ft., and the 10-30 a pay sector of 140 ft.

**The lease sale . . .** If there was ever any doubt about future development of Swan Hills, the April lease sale by the Alberta government dispelled it.

The sale brought in $16.8 million, of which nearly $12 million was for oil and gas leases around Swan Hills.

The highest bidder was the Home Oil group, which consists of Home Oil, French Petroleum Co. of Canada, Ltd., Kern County Land Co., and United Oils, Ltd. The group bid $6,507,700 for one tract of 92,160 acres, or $70.11 per acre. The same group paid another $3,345,500 for five 320-acre tracts in the proven area.

Fargo Oils, Ltd., got the three remaining parcels in the proven area for $765,000.

Other high bidders at the lease sale included:

**. . . Imperial Oil, Ltd.,** and Shell Skeena Exploration, Ltd., $762,464 for 46,080 acres in the Swan Hills region.

**. . . Imperial Oil,** $501,258 for 46,080 acres in the same area.

**. . . Shell Smoky Exploration, Ltd.,** two tracts—$809,751 for 88,000 acres in the Clear Hills area near the British Columbia border and $607,651 for a 68,650-acre reservation.

**. . . Argo Oils, Ltd.,** $505,000 for 960 acres in Pembina field.

**. . . Western Decalta Petroleums,** Ltd., and Consolidated East Crest Oil

## PIPELINE

**Producers Pipelines, Ltd., has** awarded contracts to Majestic Contractors, Ltd., to build gathering-line extensions in oil fields of southeastern Saskatchewan. The project includes 50 miles of 4 and 6-in., to be completed October 30, 1958. Work is already under way. In connection with this expansion a 2,400-hp. pumping unit will be installed at the Steelman station and a 2,700-hp. unit at Alida on Westspur Pipe Line Co. a subsidiary of Producers Pipelines. The station expansion will be completed October 30 also.

**Manufacturers Light & Heat Co.** plans to lay 28 miles of 8, 12, and 26-in. line this summer and fall. The new line will be located in Ohio and Pennsylvania. The company has installed 5,280 hp. at its Majorsville-Dallas, W. Va., compressor station under contract with J. F. Pritchard Co. and Dravo Corp.

**Northern Illinois Gas Co. has** engaged Williams Brothers Co., Tulsa, as engineers and managers of construction for a 140-mile, 24-in. line

Co., Ltd., $348,482 for 640 acres at Pembina.

**Home's holdings . . .** The tract for which the Home Oil group paid $6,507,700 is located 3 miles southeast of the closest oil production.

The area at Swan Hills is virtually impassible during the spring and summer months because of the muskeg, but a number of methods are being examined to make possible at least development drilling during those periods.

With its big new holdings, its numerous exploratory successes, and its commitment to build a pipeline, Home Oil can be expected to carry out a big-scale drilling program.

The year-old successes at Swan Hills and neighboring Virginia Hills make the area one of the most significant on the continent. Except for proven locations, no attempt has been made to estimate the extent of the reservoirs or the probable oil reserves.

Home Oil gave one clue to the potential of the area when it stated in its annual report for 1957: "Already between our original Swan Hills discovery and two other recent step-out successes lies an area larger than the Harmattan field of southwestern Alberta, on which 67 producing wells have been drilled."

# Locals Leery of OCAW Plan

MANY LOCAL negotiating committees of the Oil, Chemical, and Atomic Workers International Union are balking at a section of the 1958 collective-bargaining program calling for long-term contracts.

They feel that contracts of 2 or 3 years' duration, as proposed by the bargaining-policy committee of the 200,000-member union, would tie them down.

Most OCAW contracts in previous years, particularly those covering 105,000 members in the oil industry, were for 1-year periods.

The 1958 program proposes 2 or 3-year contracts, providing they guarantee wage and other goals sought by the various bargaining units.

These are a general increase in wages equal to the increase in cost of living, an additional 3½% per year, annual review of wages for adjustment, a right to cancel the contract if the employer lays off or gives notice of terminating 5% or more of the bargaining unit within any 1-year period, and substantial severance pay to laid off workers.

OCAW said long-term contracts would benefit the rank and file members by:

**. . . Removing the cost in money** and energy of annual negotiations. Both the international and the local unions now spend heavily on annual negotiations.

**. . . Eliminating some of the** "tensions and strains of the annual union-company argument and the attendant risk of strike or lockout."

**. . . Guaranteeing stabilized** conditions for the workers over a longer period and eliminating the risk to the employer of labor disputes each year.

The union says that management would benefit, too, since the employer signs a union contract to secure a guarantee that there will be no changes in his labor costs and no labor trouble.

OCAW said that the employer grants improvements in return for an agreement that the union "will get off his neck for the duration of the contract. This being so, it is logical that he can afford to give more for a long-term guarantee of 'no trouble' than for a short-term agreement."

OCAW expects the companies to reject wage increase demands at the start of the campaign because sales and profits are down, and because of habit.

# BRIEFS . . .

proposed from East Dubuque to Des Plaines, Ill. The project requires Federal Power Commission approval of a Northern Natural Gas Co. plan to increase its capacity to deliver gas for the 24-in. line. Williams Brothers is making preliminary engineering and right-of-way studies.

**Cities Service Co., one of the early** developers of natural-gas transmission and distribution systems, has disposed of its last public-utility interest. It has sold all public-utility assets of Dominion Natural Gas Co., Ltd., a subsidiary, to Union Gas Co. of Canada, Ltd., in Ontario.

**Saskatchewan Power Corp. has** awarded contracts for its 1958 expansion. The contractor and successful bids are: Engelking & James, Ltd., Calgary, $679,210 for the Hatton-Success transmission line; $123,973 for the Many Islands gathering line, and $5,796 for the Mid-Continent line; Fulton Banister, Ltd., Edmonton, $768,444 for the Moose Jaw-Regina-Steelman transmission line; Swift Current Construction Co., $110,059, to connect Many Islands wells; and Robb Construction, Ltd., Regina, $96,440 for the Swift Current and Hatton gathering systems. The bids are for labor only. No materials are involved. Some 200 miles of main line and 75 miles of gathering line will be constructed.

**Trunkline Gas Co. has awarded a** contract to Missouri Valley Dredging Co., Omaha, to construct a submarine crossing of the Red River in Rapides Parish, Louisiana. The company will lay 26 and 24-in. lines, each about a mile long, at a cost of $1,750,000. The crossing, to be completed by January, will supplement two 24-in. and two 12-in. lines and offer insurance against a break which would curtail gas deliveries. One 24-in. line ruptured by floods a year ago has been replaced.

**The gas industry will spend some** $36 million for construction between now and 1970, when outlays are expected to peak at $3.6 million. These estimates by the American Gas Association are based on forecasts which call for gas sales in 1970 to be more than double 1957.

## Also for Pipeliners . . .

**IN THE NEWS:** FPC tentatively approves 22.8-cent initial price for South Louisiana gas being dedicated to Southern Natural (p. 54) . . . Another new record price may be set in other Louisiana gas negotiations (Newsletter) . . . More oil men are taking an optimistic view of upturn, Journal editors find in talking to well-placed people over the country (p. 56) . . . Home Oil plans a 130-mile crude pipeline from mushrooming Swan Hills region into Edmonton (p. 66) . . . A $9-million pipeline-refinery project in Paraguay is near final planning stages. Involved is a 441-mile, 6-in. crude line from Villa Montes, Bolivia, to Villa Hayes, Paraguay. It would move crude from Camiri and Sanandita areas to 5,000-bbl. plant planned near Asuncion (p. 75) . . . Argentine Government has opened bids on a 450-mile, 14-in. crude line from Neuquen Province to Bahia Blanca (p. 79).

**PLUS THESE TECHNICAL REPORTS:** Divers find, help repair damaged crossings (p. 106) . . . Pipeline construction report (p. 123).

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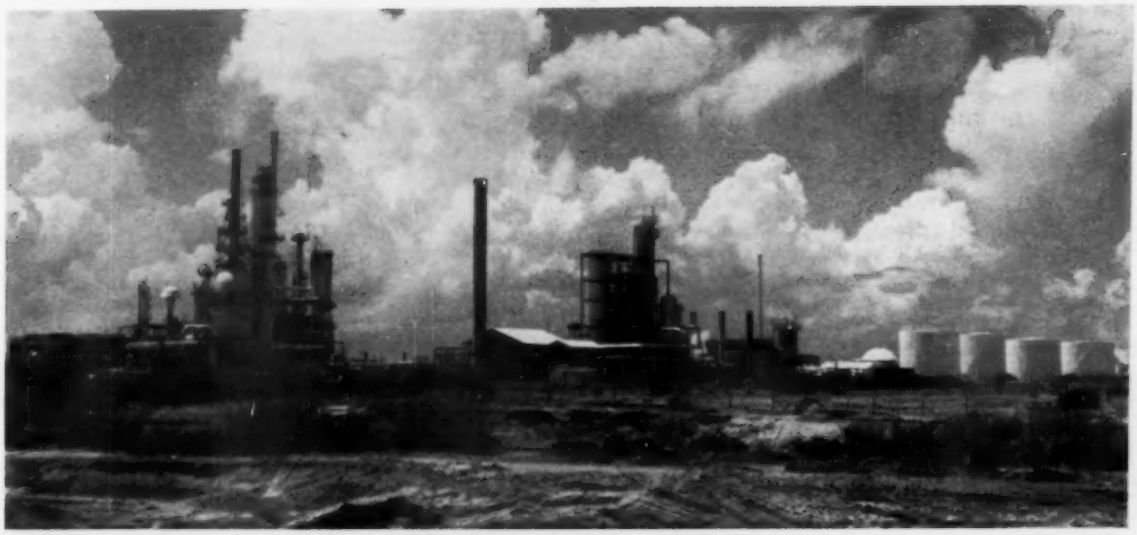

THIS 65,000-bbl. refinery at Corpus Christi is involved in a big deal with . . .

# Sunray Planning to Take Over Suntide

SUNRAY Mid-Continent Oil Co. is arranging, through a stock exchange, to take full control of the Suntide refinery at Corpus Christi and thus acquire a place to park a portion of its Venezuelan crude output, now being developed.

Directors of Sunray and Suntide Refining Co. reached a memorandum agreement last week that a merger of the two companies will take effect September 1—the same date that Sunray's import allocation of 5,000 bbl. per day begins operating.

The agreement is subject to approval of 66⅔% of the stockholders of each company.

The Corpus Christi refinery has a 65,000-bbl.-per-day capacity that can be boosted to 75,000 bbl. if necessary.

**The advantages . . .** Sunray presently owns about 50% of Suntide Refining and furnishes 16,000 to 17,000 bbl. per day of its own South Texas crude production for the plant. By acquiring full control of the refinery Sunray will have an assured continuous outlet for this crude along with as much crude from Venezuela as its import allocation permits in the future.

Sunray owns a portion of three concessions in Venezuela — two in Lake Maracaibo and one in Monagas. Its concession group has one well established in Block 10 of the lake and two more drilling. Another test is being drilled in Block 17, and exploration is under way in the Monagas concession.

Officials of Sunray are not stating specifically what their plans are for moving the Venezuelan crude they expect to develop, but the deal to take over the Corpus Christi refinery would tie in perfectly. One Sunray official said frankly "it would be pretty good logic."

**Marketing . . .** Sunray gave no hint as to future plans for marketing the output of the refinery. In reply to a suggestion that the company could expand the retail outlets into Texas, an official said, "That's too far in the future. We have no plans of that kind."

The Suntide refinery has a UOP fluid catalytic cracking unit of 25,000-bbl. capacity for high-octane gasoline, and polymerization, gas concentration, and alkylation units. Last year a Rexformer, Unifiner, and a Udex extraction units were added to produce aromatics such as benzene, toluene, and xylene. Throughput averaged 49,000 bbl. daily in 1957.

Suntide also owns Suntide Pipe Line Co., which transports Gulf Coast crude to the refinery. Refinery products are marketed a variety of ways —through pipeline, rail, ocean-going tankers, barges, and truck. The company operates a deep-water terminal on Nueces Bay.

Under the memorandum agreement, one share of Sunray Mid-Continent common stock would be exchanged for four shares of Suntide common stock. Sunray's stock currently is selling for about $24 and Suntide's about $6.

Sunray owned approximately 50% of Suntide's 3,125,000 shares of common stock on December 31. Suntide, organized in February 1952, is headed by Floyd L. Martin. T. E. Fitzgerald, Suntide executive vice president, is also executive vice president of Sunray's refining and marketing subsidiary, D-X Sunray Oil Co. Also Edward Howell is vice president and general counsel of both Suntide and Sunray Mid-Continent.

The Suntide refinery went on stream in early 1954 with a design capacity of 26,300 bbl. per day. This was nearly doubled the next year and then was increased to 65,000 bbl. to become one of the nation's biggest independent refineries.

## Union Switch Costs Jobs

A CHANGE in union representation has cost 17 long-time employes their jobs at the Wood River, Ill., refinery of Standard Oil Co. (Ind.).

After the AFL-CIO boilermakers union local 483 was certified as bargaining agent for boilermakers, 17 of its members were laid off because they were working at nonboilermaker jobs, such as driving trucks and pipefitting.

Refinery officials said they must assign nonboilermaker work only to employes represented by Central States Petroleum Union Local 115.

The 17 employes, who switched to the boilermaker union from the CSPU, are being replaced by CSPU workers laid off several months ago.

# Cheaper Drilling a Must

**. . . Loffland Brothers official tells API production men in Denver. Need for new techniques, research stressed.**

IF DRILLING costs aren't cut, U.S. oil men will be supplying less and less of the nation's future demand.

And drilling costs can be cut only if operators cooperate more closely with drilling contractors, and if new techniques are perfected to speed drilling.

These are the conclusions of Jack Marsee, of Loffland Brothers Co., Tulsa, presented last week in Denver before the Rocky Mountain district of the API Division of Production.

The recession, by stunting the growth in oil demand, has cut sharply into drilling activity. But an even greater threat to a healthy industry is posed by rising costs, Marsee said.

Either crude-oil prices must go up or the cost of finding and producing oil must come down if the U.S. oil industry is to hold its own in the market.

**How to cut costs . . .** Drilling contractors have gone a long way toward reducing drilling time—the surest way to cut costs.

But they've gone about as far as they can go until contract prices rise enough to let them buy better equipment, develop personnel, and do research on drilling techniques and equipment, Marsee said.

It's now time, he suggested, for the operator to pitch in and help. Here's how the operator can help:

**. . . Let contracts** for three or more wells at a time. Crews will always do better on a second or third well in a given area, thus cutting costs after the first well. These contracts also would cut transportation costs and rig-up expenses where skidding is possible.

**. . . Give the** contractor more information on geology. This helps plan bit programs, deal with bore drift, and combat lost circulation.

**. . . Modify** hole-deviation requirements. Less stringent requirements can cut costs. So will planning locations to take advantage of the natural drift that takes place in an area. Deviation limits expressed as maximum-rate change of deviation or direction are especially helpful where use of oversize drill collars, antidrift subs, and stabilizers is reasonable.

**. . . Consider penetration** rate in choosing mud. Muds vary in their ability to help speed drilling rates. Good hydraulics helps offset a poor penetration-rate mud, but fastest penetration is achieved by a good mud and good hydraulics working together.

**Outlook for technology . . .** Air or gas drilling, the turbodrill, and drilling-mud additives show the most promise in improving drilling rates, Marsee said.

Air or gas drilling has yielded the only really exciting results of all innovations in the past 10 years. Still needed here: An economical method of shutting off water.

The turbodrill seems to be rugged and simple. But considerable development work on a bit will be necessary for it to have a significant part in the economics of drilling.

Drilling-mud technology is responsible for much of the gain in drilling efficiency in the past 10 years, Marsee said. Latest development is an additive which adds life to rock-bit bearings (OGJ, Feb. 24, p. 94) and which should cut drilling time.

This additive, Marsee said, is the only development which does not require additional investment in equipment to be used.

There may be some delay in putting new technological devlopments to work, Marsee added.

"Most improvements in tools or techniques will require additional investment. The contractor's present margin of profit over cost will delay the use of even the most worthwhile tools, because there is no room for error when a contractor spends his money for new equipment."

# Well Blows Wild

**for 4½ hours at Smackover after control head removed.**

THE OLD Smackover field in Union County, Arkansas, got a reminder of its boom days of the early 20's last week when a newly drilled well blew in and flowed over the top of the derrick.

The well, drilled by H. T. Pannell, was starting to test the area's shallow Nacatoch sand at 1,950-2,030 ft. There had been no sign of gas pressure, so the control head was taken off to run the swab for cleaning the hole and lightening the fluid column.

On the third run of the swab the well "kicked," blew the swab from the hole, and began flowing a full stream of oil through the open 5½-in. casing.

Before the well was brought under control 4½ hours later, the flow was estimated at 12,000 to 15,000 bbl. per day.

The well had been drilled to 2,708 ft. and cased to that depth. It had been perforated opposite the Nacatoch sand, in which logs indicated 30 ft. of clean oil sand. This horizon has produced in some other wells in the area but generally has been regarded as depleted. Most of the newer wells are being completed in the deeper Blossom or Tokio sands.

## Lower Pipeline Rate Asked

FOUR CORNERS Pipe Line Co. has filed for authorization to lower tariffs for moving crude oil through its new pipeline.

The company has proposed a reduction of 5 cents to 50 cents per barrel for transporting crude from the Four Corners area to the Los Angeles refining area. The new rate would become effective May 22.

A company spokesman attributed the proposed tariff reduction to the fact that initial throughput of the line was greater than had been anticipated when original rates were filed with the Interstate Commerce Commission. The line is moving about 70,000 bbl. per day, which is rated capacity.

# *INDUSTRY*

**Oil conservation legislation will be** back before the 1959 session of the Nebraska Legislature, with its chance for passage considered good.

The bill would set up a three-member commission—the governor, state geologist, and one other qualified person—to regulate development of a field so maximum production is obtained.

**North Dakota has cut per unit allowable** for May from 7 bbl. to 5 bbl., but production is expected to rise by more than 2,000 bbl. per day because operators will be making up underage and reducing field storage. Estimated production for May is 42,000 bbl. daily, compared with less than 40,000 for April.

Under the new base allowable of 5 bbl. daily per 40-acre unit, production would be about 33,000 bbl. per day, but the underage and field storage will amount to another 9,000 bbl.

## Trainer Built for Toledo Cat Cracker

SUPERVISORS and operators at the new Toledo refinery of Standard Oil Co. (Ohio) will learn how to operate the fluid catalytic cracker with a trainer which duplicates the actual panel board.

Carmody Corp., Buffalo, built the trainer, first of its kind to be used in the petroleum industry. It can be made to simulate operating conditions at the plant.

In the picture above, three Sohio representatives are conducting the final acceptance inspection at the Carmody plant. Dean S. Turner, center, is a member of Sohio's industrial-relations staff. Donald R. Roberts, left, and John R. Bender, right, are process assistants at the Toledo refinery.

The Toledo refinery, costing approximately $40 million, will be completed this summer. The cat cracker has a 55,000-bbl. per day capacity with 45% recycle.

## Merger Is Planned

### by Sunset and McCrae, but Tradewinds is not involved.

NEGOTIATIONS were under way last week in Los Angeles to merge McRae Oil & Gas Corp. with Sunset International Petroleum Corp.

If the merger is worked out, McRae will become a Sunset subsidiary, giving Sunset exploration and production operations in the Rocky Mountains, Texas, and the Mid-Continent.

A preliminary step was taken last week by McRae. It moved to make its subsidiary, Tradewinds Exploration, Inc., independent of McRae so that Tradewinds would not be involved in the merger.

Tradewinds was formed a year ago to handle McRae's foreign operations. It holds 6 million acres in Panama and an interest in a Honduras concession.

J. A. McRae, president of McRae Oil & Gas, was elected president of Tradewinds. McRae stock in Tradewinds will be distributed to McRae stockholders May 15 at a rate of 65 shares of Tradewinds stock for 100 shares of McRae.

The merger of Sunset and McRae will give Sunset 4,000 bbl. daily net crude production and about 8 million cubic feet daily gas production.

The move follows on the heels of the sale by Sunset of its 9,000-bbl. Torrance, Calif., refinery and marketing facilities to Panama Refining & Petrochemical Co.

## BRIEFS . . .

The underage developed during March because of a temporary shutdown at the Mandan, N. D., refinery of Standard Oil Co. (Ind.).

**Gulf Oil Corp. will cut its purchases** of crude oil from Alabama's Citronelle field by approximately 10%, effective May 1. The cutback will amount to about 1,200 bbl. daily. Gulf, sole purchaser in the field, reduced its take 20% last August.

**Richfield Oil Corp.'s operating contract** with the city of Long Beach, Calif., in Fault Block IV of Wilmington field has produced $82,157,202 in the 10 years it's been in force. The city and state's share totaled $58,701,849, or 71.45% of the revenue. This was divided equally between the two governments. Richfield's cut was 5.9%, which amounted to $4,847,275. The remainder was paid to Richfield for reimbursable expenses. Dry-gas revenues to the city amounted to $5,282,758.

**The exodus of oil companies from** downtown Los Angeles continued last week when The Texas Co. moved to its new 12-story building on fashionable Wilshire Boulevard. The building will house Texaco's 650 employes working in the company's West Coast headquarters division. It has a four-level parking lot and complete air conditioning.

**The Maritime Administration has** put into the water what may become the nation's first nuclear-powered tanker. Designed primarily as a high-speed merchant tanker but with specific defense features if needed, the $10.1-million, T-5 prototype ship can serve either in commercial service or as a naval oiler.

The 615-ft. vessel is designed to carry 180,000 bbl. of oil. Initially to be powered by conventional engines, it may later be equipped with nuclear power.

**Jupiter Oils, Ltd., has purchased a** one-half interest in 61,950 acres of oil and gas leases in Grand, Uintah, and San Juan counties, Utah, and Mesa County, Colorado. Jupiter paid Entrada Oil & Gas Co., Denver, more than $500,000 for the lease interest. Production will have access to a line to be built by Pacific Northwest Pipeline Corp.

**Wood River Oil & Refining Co.,** Wichita, Kans., has purchased Sinclair Pipe Line Co.'s southeastern Kansas crude-oil gathering system. Facilities consist of 350 miles of 2 to 8-in. crude lines connected to leases in Montgomery, Chautauqua, Elk, Cowley, Butler, and Greenwood counties. Wood River will take possession July 1 and continue operating the system in connection with its oil purchasing business.

The main bearing is the heart of any swivel, the most important single component. Main-bearing capacity tells the tale. If it's high, you've got the first ingredient of a good swivel.

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# Conoco Plans New LPG Flood

CONTINENTAL OIL CO. last week was preparing to launch its second miscible-phase displacement project—this one in Texas.

The company has asked the Texas Railroad Commission for a permit to start a propane slug-type drive in the Frio H-4 reservoir of Rincon field, Starr County.

The project, if approved, would be developed along the same line as the pilot operation under way on a 640-acre lease in Oklahoma's Short Junction field.

The Frio-H-4 reservoir is a sand lens discovered in 1950 at about 3,600 ft. It is enclosed by shale on three sides and water on the west flank.

Conoco expects primary recovery to be poor—only about 432,000 bbl. or 15% of the 2,900,000 bbl. believed to be originally in place. Through March, the field had produced 223,280 bbl. or about 7.6% of that in place.

Only three wells are now producing from the pool. And the field's bounds have been defined on all but the southwest flank. The lens has an average 11-ft. of pay over the 243 productive acres.

Conoco told the commission its study of the reservoir indicated that a miscible-type flood would recover considerably more oil than other secondary drives and that water-flooding is unfeasible.

Company engineers predict that the propane-slug drive will more than triple the estimated primary recovery —boosting total oil take from the lens to at least 48% of original oil. And the percentage could go higher.

**Four stages planned . . .** Conoco tentatively plans to carry out the project in four stages. The commission was asked to approve only the first stage which would be confined to one lease and would last about 2 or 3 years.

In this first stage, 27,000 bbl. of propane would be injected into the 120 Slick A and chased with gas. Conoco engineers predict that added oil recovery will show up in the nearest producer, the 127 Slick A, before the propane reaches this well. The project should not be condemned, however, if this doesn't take place, the company said.

When propane does show up in the 127, an added 12,000 bbl. of propane followed by 36,000 bbl. of water to form a block will be injected into that well in the second stage of the project. Gas injection would continue into the 120 Slick A to drive the LPG to 70 Slick C.

The third stage would involve drilling another well, 71 Slick C, which would become the producer while LPG and water injection would be shifted to the 70 Slick C. Volumes injected would differ from those of the second stage due to the difference in pore space.

The fourth stage would repeat the same project. LPG would be injected through 71 Slick C and would be driven (with the oil ahead of it) to 145 Slick HB and to a second well drilled on the HB lease at that time.

Conoco told the commission that it planned to ask approval of stages 2, 3, and 4 later on, provided the first stage is successful and that current unitization efforts are successful.

# Deep Mississippi Test Hits

A DEEP TEST in South Mississippi's Soso field last week not only gave the state its first Cotton Valley-Jurassic production but extended production from that horizon more than 200 miles from its nearest other field in the Monroe areas of northeastern Louisiana.

The new discovery well, drilled by Gulf Oil Corp. on its Z. B. Soso Unit Tract 28-7, also sets a new producing-depth record for Mississippi with pay at 15,247-56 ft. This is 829 ft. deeper than the state's previous deepest production, a gas-condensate well, now abandoned, completed in Tinsley field in 1951.

Production in the deep Soso well is 37.6°-gravity oil. Flow in precompletion tests through 5/8-in. and 1/4-in. chokes was at rates up to 528 bbl. per day with top pressure of 150 to 250 psi.

Gulf had drilled the hole to 19,040 ft., at which depth is the second deepest test ever drilled in the state. This lacks 1,410 ft. of equalling the record depth of 20,450 ft. set by a wildcat in Stone County.

Before final completion of its well, Gulf plans to test promising oil showings in shallower horizons, principally in the Lower Cretaceous-Hosston zone above the Cotton Valley. If commercial production is proved in the Hosston it will open another pay zone for Soso field.

Other oil production at Soso, the state's most prolific Lower Cretaceous field, is from the Rodessa and Sligo-Bailey sands. The field also is gas-productive from the shallower Lower Cretaceous-Paluxy zone and from Upper Cretaceous-Eutaw sands.

# KMA Flood Asked

## by Shell in big Texas field. Working interests approve.

SHELL OIL CO. has asked Texas Railroad Commission to approve a unitized flood in big KMA field of North Texas. Shell predicted the flood will recover an extra 15,500,000 bbl. of oil over total primary take.

The flood would be carried out in the KMA's Zones 1 and 2, which produce from about 2,800 ft. in Wichita and Archer counties (OGJ, Dec. 23, 1957, p. 36).

It would be operated in stages, the first of which would affect roughly 1,800 acres with 61 input wells and 59 producers. The flood ultimately would extend to the entire 4,640 acres included in the projected unit and have 175 producing wells.

The projected unit includes about one-sixth of the 30,000-acre reservoir. Production from the unit area since its first well was completed in 1937 now has reached 22,600,000 bbl. from the two zones. And operators estimate that the pay is 94% depleted by primary means. Only 228 of the area's 272 wells are on production. They make only about 500 bbl. of oil daily—an average of just over 2 bbl. each.

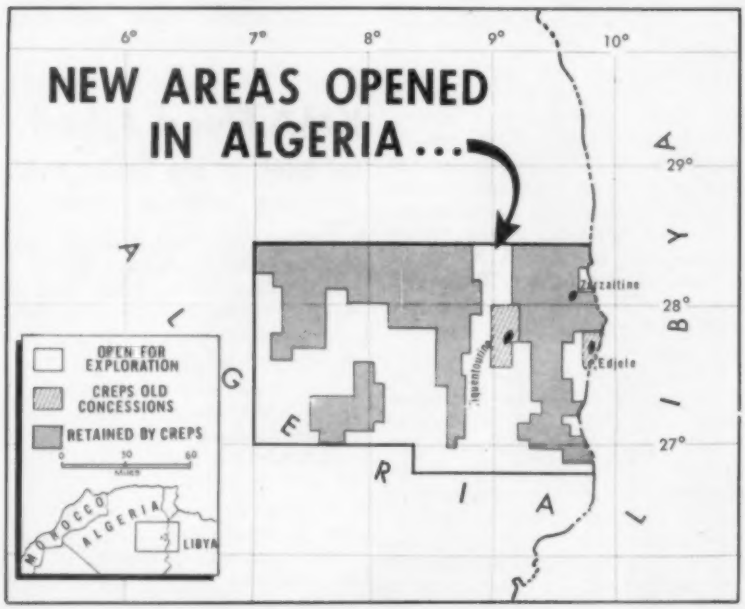
Shell, which would become unit operator for itself and 44 other companies with production in the area, estimates original oil in place under the projected unit at 89,200,000 bbl.

**Injection plans . . .** Shell plans to inject about 600 bbl. of water daily by gravity into the pay zone through each input.

It will use brackish water from a 50-ft. zone and inject it through a closed system on an irregular 29-acre, five spot pattern.

The company told the commission that 100% of the working interests and 99.7% of the royalty interests in the unit area had signed the unit agreement.

This will be the second artificial drive undertaken in this area of KMA. Operators joined in 1939 in a pool-wide gas reinjection program. More than 19 billion cubic feet of gas was returned to the reservoir before the method reached its effective limit.




# Algerian Rights Eyed

**. . . by five groups seeking concessions near Edjele and Zarzaitine fields. CREPS was forced to give up acreage.**

FIVE GROUPS have applied for acreage in southeastern Algeria near the Edjele and Zarzaitine discoveries of Cie. de Recherches et Exploitation de Petrole au Sahara (CREPS).

The bidders are seeking rights on half a big block given up by CREPS due to the expiration of its 5-year exploration license. Zarzaitine, located near the Libyan border on acreage retained by CREPS, may rival Hassi Messaoud in importance. The field's ZR-2 tests 3,200 bbl. daily of 43°-gravity crude from a 164-ft. section.

Three of the bidder groups are wholly French. Cie. Francaise des Petroles d'Algerie (CFP-A) asked for 2,360 sq. miles, Repal, Francarep, and Eurafrep jointly want 1,510 sq. miles, and Safrep, 750 sq. miles.

Two West German companies and Coparex, owned by Suez Canal Co. and other interests, applied for 3,430 sq. miles. An Italian company, Ausonia Mineraria, applied for 750 sq. miles. This is the first attempt by German or Italian firms to participate in the Saharan oil play.

Two groups applied for rights in the south central Sahara relinquished by CFP-A. Royal Dutch-Shell has 65% interest in this company. It is 35% owner of CREPS.

Omnirex, owned by the French affiliate of Phillips Petroleum Co. and Omnium Francaise des Petroles, together with Copefa applied for 4,390 sq. miles. Coparex asked for 2,420 sq. miles.

**Sinclair wins rights . . .** Sinclair Oil Corp. and Newmont Mining Corp. have an interest in four tracts totaling a 3,100-sq. mile concession in the general vicinity of Hassi Messaoud field.

Sinclair has 27%, and Newmont, 18%. Their partners are Lazard Freres et Cie., a French banking firm, Soc. Francaise de Recherches de Petrole, a subsidiary of Bureau de Recherches de Petrole, and l'Omnium de Valeurs Agricoles Industriales et Minieres, a mining investment company.

The award had been expected since seven other concessions were started in the same area in February. These cover areas given up by CFP-A and SN-Repal. Earlier winners included two American and one British company, and the Shell Group (OGJ, Mar. 3, p. 84).

The earlier concessions totaled 28,600 sq. km., and the seven firms agreed to spend almost $18 million for exploration.

## Fish Lands Rights

**in Bolivia with high bid. Offer breaks precedent.**

FISH INTERNATIONAL Corp. has officially tied down the 108,000-acre Madrejones concession in southeastern Bolivia.

The affiliate of Fish Engineering Corp., Houston, won the acreage with a precedent-breaking offer of 50% of gross crude output. Under the standard 50-50 profit split, a country receives up to 50% of net profits.

The split on gross production, plus an offer of $17,750,000 in cash and credits, made Fish the leading contender among half dozen competing companies.

Fish will pay the government $4,000,000 in cash within 6 months. This will cover a $1,500,000 bonus, and a $2,500,000 advance royalty payment. The company will make the remaining $13,750,000 available in loans, repayable in 5 years at 6½% interest. Credit for $1,500,000 will be in United States dollars, and the rest in European currency (OGJ, Mar. 24, p. 108).

The Madrejones concession lies between the Argentine border and acreage held by TULM Corp. of Houston. Oil reportedly has been found on the Argentine side of Yacuiba anticline. Other Salta Province fields are comparatively prolific.

Both oil and gas were found in the TULM area when it was held by Glen McCarthy. The concession is now owned jointly by Tennessee Gas Transmission Co., Union Oil & Gas Corp. of Louisiana, Lion Oil Division of Monsanto Chemical Co., and Murphy Corp. A wholly owned subsidiary of Tennessee Gas, Chaco Petroleum, S. A. is the operator.

## "Unwanted" Rights Granted

THE GOVERNMENT of British Guiana has granted a concession over offshore and coastal areas to Standard Oil Co. of California.

California Exploration Co., the operating subsidiary, applied for the rights nearly a year ago. A local company will be formed with a capitalization of $720,000. Reports from Georgetown are that the offshore area is near the Venezuelan border and will be the center of interest.

Several companies in the past took a look at the colony and walked away. The area is not considered hot but is

too close to Venezuelan and Trinidad production to be ignored.

McBride Oil & Gas Corp., A Texas independent, was the last company in the area. It concentrated its exploration efforts in the eastern part of the colony. Before that, Panhandle Oil Corp. gave up a license after preliminary geological studies. Trinidad Leaseholds, now Trinidad Oil Co., drilled an unsuccessful well in 1944.

## Platform Ordered

### by Shell for drilling in the China Sea off British Borneo.

A ROYAL DUTCH-SHELL company has ordered a DeLong mobile drilling platform for an exploration program in the South China Sea off British Borneo.

Brunei Shell Petroleum Co., Ltd., will use the 5,400-ton outfit to test a 20-mile strip running 125 miles along the northwest coasts of Sarawak, Brunei, and British North Borneo.

The platform will be completed early this summer at a Southampton, England, shipyard. Plans are to move the unit to the South China Sea in time to start a test early next year.

The 190-ft. by 106-ft. unit will drill in depths up to 120 ft. using a 12,000-ft. rig. It will drill on shallow areas caused by upwarps of the sea bottom. These are usually covered with coral.

**Past drilling . . .** The new unit is the company's second step in its offshore program started after a disappointing postwar search on land.

Fixed platforms were used first, but three wells drilled from two of them found nothing of interest. Two were at Siwa, 8 miles off Sarawak. One was at Ampa Patches, 20 miles off Brunei. A third fixed platform has been set up 30 miles north-northwest of Labuan Island.

Seria field in Brunei is one of the Shell group's prize properties. More than ⅓ billion barrels of crude have been produced since its discovery 29 years ago. Current output is about 115,000 bbl. daily. Miri field in Sarawak produces 1,200 bbl. daily.

Helicopters will be used to ferry crews, food, and light freight to the platform. Three crews will be used, with two on board at a time working on a double-shift system. The schedule for each crew will be 12 hours on and 12 hours off for 8 days, followed by a 4-day break on shore.

# Paraguay Interest Picking Up

### . . . with three more companies entering Pure concession. Proposed pipeline-refinery project also in the mill.

THREE MORE companies will participate in a 23,400-sq.-mile concession in northern Paraguay held by Pure Oil Co. and Williams Brothers Co.

The new partners are Paraguay Gulf Oil Co., Sinclair Paraguayan Oil Co., and Tidewater Oil Co. Preparations are already under way for the first wildcat.

Pure Oil Co. of Paraguay, Inc., continues to be the largest owner with 30% interest, and will be the operator. Gulf has 25%, acquired from Pure. Sinclair has 15%, and Tidewater 10%, acquired from Williams Brothers, which kept 20%.

Robert L. Milligan, Pure president, said drilling on the first test is expected to start early in June. Sixty miles of a 120-mile dirt road to the drill site have already been cut through the dense forests of the Chaco region. The road is north from the terminus of a narrow gage railroad, extending 70 miles eastward from Puerto Casado on the Paraguay River.

When the concession was obtained last October, Pure agreed to start the first of two wells within 8 months. The wildcat will be the first drilled in the country since Union Oil Co. of California held a concession in the 1940's. Union pulled out of the country after drilling five dry holes.

**Other activity . . .** Another drilling program is planned by Rimrock Tidelands, Inc.

Rimrock announced early this year it would get the earliest possible start on a well in one of three tracts covering 7,500,000 acres (OGJ, Feb. 3, p. 71).

**Refinery project brewing . . .** In another industry development, Williams-McWilliams Industries, Inc., said in New York that it has received assurance of a $9,000,000-contract for a pipeline and refinery project in Paraguay.

The firm has no connection with Williams Brothers Co.

The 441-mile, 6-in. pipeline would extend from Villa Montes, Bolivia, to Villa Hayes, Paraguay. It would carry crude from the Camiri and Sanandita producing area to a 5,000-bbl. refinery planned near Asuncion.

Several months ago Five Lilles, a French contractor, announced it had a contract to build the pipeline. The government has been encouraging the pipeline-refinery project, but it has been held up by the need for throughput guarantee and financing.

# Japan Steps Up Hunt

## . . . for oil with promising results. Three fields have been discovered, and offshore search is moving into high gear.

INTENSIVE EFFORTS to find more oil in Japan are paying off.

Now in its second year and bolstered by government help, Japan's domestic exploration program can boast of three new field discoveries and a new producing horizon in its biggest producing field at Yabase. Before the year is over, an offshore search will move into high gear with a new $1,670,000 drilling platform.

Japan produces only a little more than 6,000 bbl. daily—less than 3% of her annual oil consumption which is growing every month. The continued and ever-growing drain on the country's foreign exchange for oil imports prompted the government to get behind oil exploration actively in 1955. The vehicle for the new effort was the new Japan Exploration Co., owned jointly by the government and Teikoku Oil Co.

The program involves exploration in new areas of the Japanese islands and also a search for deeper and more prolific oil sands in the old producing areas. It's a discovery of the latter type that has Teikoku excited.

The company is testing a new 90-ft. pay section in the Koya district of Yabase field on the outskirts of Akita with the best results it has ever obtained in a Japanese well. The company got 48 bbl. of oil in a 10-minute drill-stem test of the section from 3,065 to 3,163 ft. In a later test the well produced at the rate of about 60 bbl. an hour.

Yabase field, discovered in 1939, is the biggest single field in Japan. It accounts for almost 4,000 bbl. daily of the country's total production.

**New field pays . . .** Tamugiyama field, discovered less than a year ago, now appears to be one of the best fields in Niigata prefecture (OGJ, Aug. 19, 1957, p. 120).

Three wells completed in the field are now pumping about 590 bbl. daily of 43°-gravity crude into a small pipeline to a river loading pier a short distance away. The discovery well tested more than 21 bbl. an hour, but has been shut down because of water encroachment. Japanese Exploration Co. estimates reserves so far at about 200,000 bbl. The field is 19 miles south of the nearest production at Mitsuke field.

A second promising field has been found at Barato near Sapporo, the capital city of Hokkaido, the northernmost big island in the Japanese chain.

The third well drilled on the Barato structure tested 500 bbl. daily of 33°-gravity crude from a shallow 62-ft. sand section from 1,154 to 1,216 ft. The well is drilling ahead below 1,300 ft.

The first two tests, Barato 1 and 2, are both below 6,500 ft. Both have encountered gas zones at about 3,900 ft. and 5,900 ft. They are both believed to be on the flanks of the structure and the third well on the top.

The new find is 9 miles south of previous production at Ishikari field.

The Japanese have apparently found another 43°-gravity field at Fukura in Yamagata prefecture, 60 miles north of any previous production.

The discovery made in mid-February tested about 190 bbl. daily from a section found at 2,653-2,768 ft. The first well was shut in after testing and four offsets are now drilling. The new field is near the coast north of the prefecture capital city of Sakata.

**Offshore drilling . . .** As a climax of seismic work off Japan's west coast in the Sea of Japan, Japan Exploration last week let an engineering and construction contract to R. G. LeTourneau, Inc., to build a 2,750-ton drilling barge.

The $1,670,000 contract needs approval by the Japanese Ministry of International Trade and Industry, but this is expected to be granted.

The three-legged LeTourneau barge, similar to those in use in the Gulf of Mexico and one recently purchased by Arabian American Oil Co. for Persian Gulf drilling, will be built in a Japanese shipyard under the designer's supervision. It is expected to be completed by September.

The new barge will be used to test the four underwater structures located in the 1956-57 seismic work done off the coast of Honshu by Geophysical Services, Inc., working on contract to the joint government-Teikoku company (OGJ, Nov. 5, 1956, p. 83).

**JAPAN'S OFFSHORE** oil search will be spurred with construction of the drilling platform shown in the illustration above.

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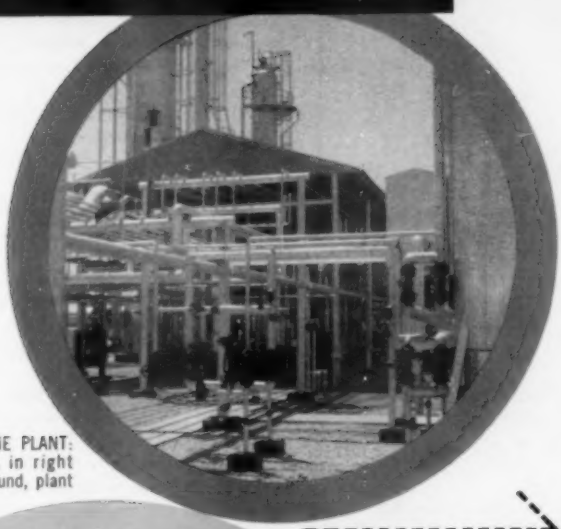
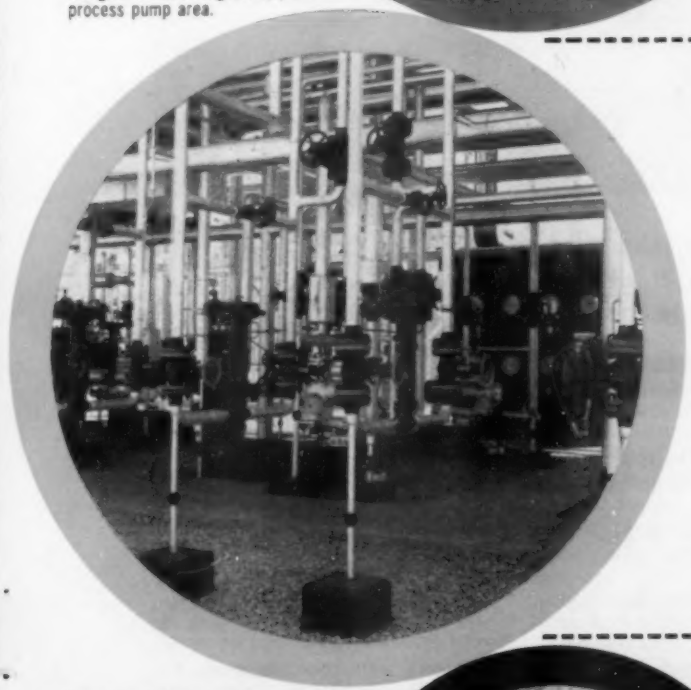
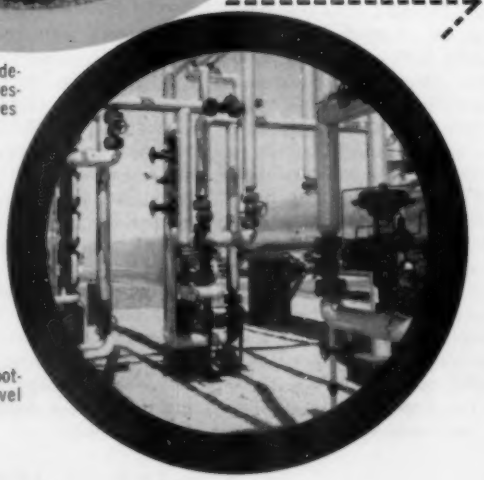


AT A KANSAS GASOLINE PLANT: Propane dehydrators in right foreground. In background, plant process pump area.



In foreground, depropanizer and debutanizer, reflux accumulator pressure relief and level control valves Reflux pumps in background.



Left to right, de-ethanizer feed, bottoms exchanger, and liquid level control valve.

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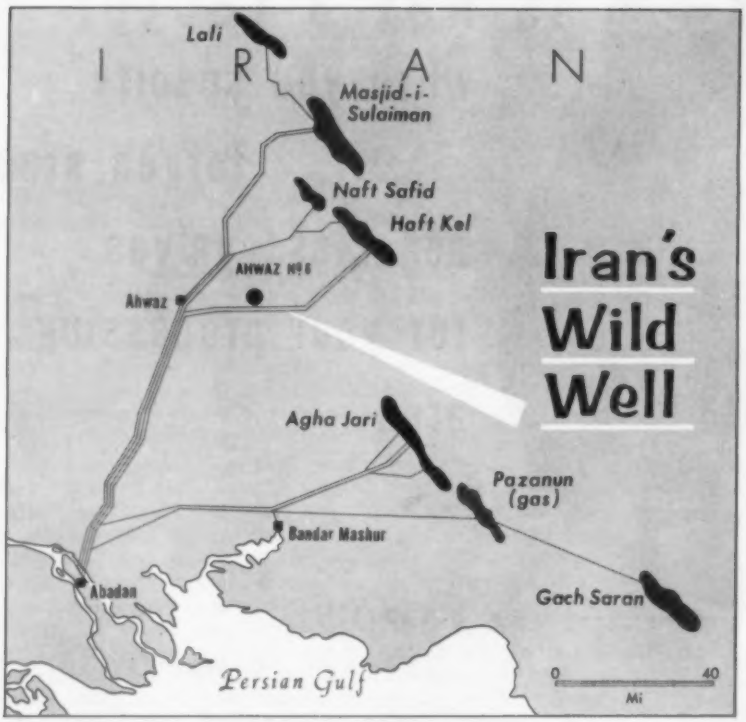



# Kinley Is in Iran

## . . . fighting wild well fed by 100,000,000 cu. ft. of gas. Flames from Ahwaz 6 are roaring 250 ft. into the sky.

MYRON KINLEY, Houston's fabled oil well firefighter, landed in Teheran last week on his second rush trip to Iran to battle a wild well in less than 2 years.

This time the trouble was near Ahwaz nearly 350 airline miles southwest of the Iranian capital and nearly 60 miles northwest of Agha Jari, Iran's biggest oil field. The wild well is in an area that has resisted the drill for 30 years.

Kinley found a roaring pillar of flame 250 ft. high fed by an estimated 100,000,000 cu. ft. of high-pressure gas daily where there had been a wildcat rig just a few days before.

The well is Ahwaz 6, spudded in December on a high crestal location of the Qarait structure which has baffled geologists and drilling crews for three decades. Less than a week before the well caught fire it had drill-stem tested gas and sweet condensate from the Asmari limestone at 7,754 ft. Wellhead pressure on that test was 2,800 psi.

The blowout is an updip offset to Ahwaz 5 which was abandoned late last year at 12,742 ft. This is Iran's deepest well to date. Ahwaz 5 found the usually prolific Asmari limestone at 11,300 ft., but it was dry.

**Ahwaz history . . .** The first test of the Qarait structure was drilled about 30 years ago in the infancy of oil exploration in Iran. It was a shallow well that never reached productive horizons.

It wasn't until 1948 that Anglo-Iranian Oil Co. (now British Petroleum) drilled Ahwaz 2. The well barely got into the Asmari lime when it was plagued with mechanical troubles and was finally abandoned with fish in the hole. This test encountered a condensate show. Ahwaz 3 had similar mechanical difficulties.

The fourth and fifth wells had been started and both were drilling below 4,000 ft. when Iran nationalized its fields and refinery and the British company was forced to leave the country. Ahwaz 5, the deep test, was the first wildcat well drilled after the international consortium resumed operations in the Iran country (OGJ, July 2, 1956, p. 79).

Iranian Oil Exploration & Producing Co., the consortium operating company, granted Santa Fe Drilling Co. the contract to go back and deepen Ahwaz 5. At that time it was the only wildcat operation in Iran.

**Kinley's been there before . . .** The new blowout is the third Iranian well since 1951 to rate Kinley's attention. All of them have been spectacular. This is the second to burn.

The first was Anglo-Iranian's now famous rig 20 which blew out at Naft Safid, about 40 miles northeast of the new fire. This well fire resisted every effort to put it out for 26 days. Kinley finally snuffed it out with a blast from 500 lb. of gelignite. Films made of that operation have become a classic movie on how to put out an oil-well fire.

Kinley's last trip to Iran was in August 1956, when National Iranian Oil Co.'s Alborz 5 blew out and spewed an estimated 80,000 to 150,000 bbl. of oil over the countryside near Qum for weeks. The well never caught fire.

# Parker Is Drilling

## in Brazil under contract. Petrobras rigs being used.

PARKER DRILLING CO. has signed a 2-year labor contract with Brazil's government-controlled oil monopoly, Petrobras, and is drilling a 9,000-ft. test about 1,200 miles up the Amazon River.

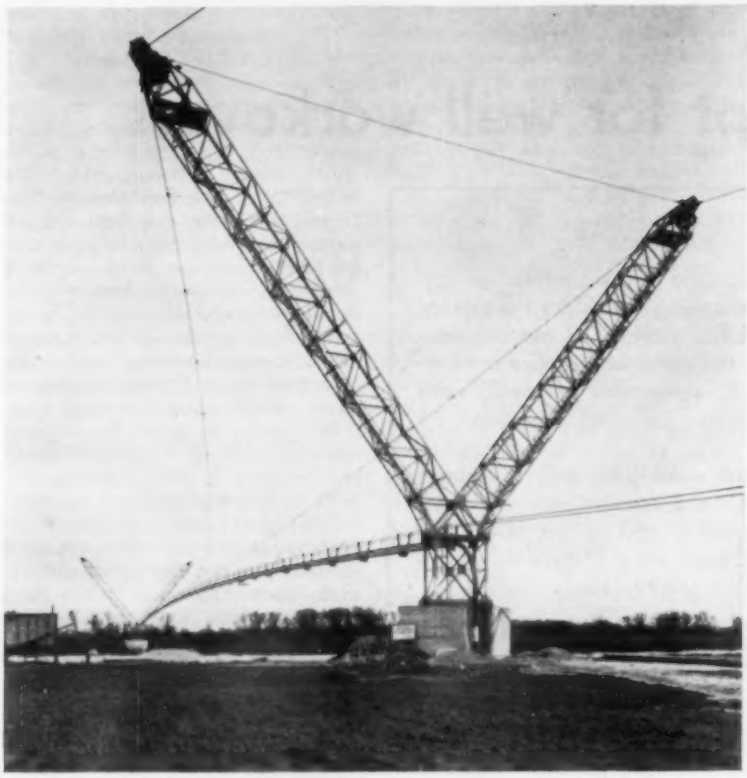
Robert L. Parker, president of the Tulsa firm, said a new company, Parker Drilling Co. of Brazil, has been formed to carry out drilling operations, using Petrobras rigs. Personnel will be moved from the U. S. to Brazil soon.

Operating base for the new company will be near Nova Olinda, where Petrobras discovered oil 3 years ago (OGJ, Apr. 11, 1955, p. 95). Pay at Nova Olinda was confirmed last year.

The area is inaccessible except by boat or air. Favorable drilling time is during the dryer season which starts late in July and continues through September.

Other companies, including Drilling & Exploration Co., Inc., Los Angeles, are also operating under contract in Brazil. Drilexco has been connected with Brazilian oil operations since 1939.

Brazil's crude-oil production last year averaged only 23,200 bbl. daily. Demand is much higher. Oil consumption last year was expected to top 205,000 bbl. daily, with imports making up the big deficit (OGJ, May 6, 1957, p. 94).



## Unusual Pipeline Bridge Spans Danube

THIS SPECTACULAR pipeline bridge crosses the Danube River with a 16-in. gas line from Zwerndorf field, which straddles the Iron Curtain on the Austria - Czechoslovakia border. The line connects Zwerndorf with Vienna and Styria.

The bridge, constructed by Waagner-Biro for Oesterreichische Mineraloelverwaltung, A.G., won the golden badge of merit of the Austrian federal republic for its designer. It has a main span of 1,050 ft. The pylons are 138 ft. above ground and the tops are 162 ft. apart. The steel cables are 2½ in. thick.

## Argentine Pipeline Bids Opened

THE ARGENTINE Government last week opened bids on a 450-mile, 14-in. crude line from Neuquen Province to Bahia Blanca.

Yacimientos Petroliferos Fiscales (YPF), the state oil agency, accepted tenders simultaneously in Dusseldorf, West Germany, New York, and Buenos Aires. The winner is not expected to be selected for at least 2 months.

The line will extend from Challaco to Puerto Rosales, near Bahia Blanca on the Atlantic Coast. It will carry crude from Plaza Huincul fields. Initial throughput will be 15,000 to 20,000 bbl. daily with one pump station at Challaco. Plans are to raise capacity to 50,000 bbl. daily later by adding three more stations.

Production from several small fields in the vicinity is now taken out by tank car. The initial field discovery in that area of the west-central province was made back in 1918.

The line may be completed in 2 years. No specific target date can be set until the financial terms of the winning bidder are known. When crude deliveries begin, the oil will be shipped northward along the coast for processing at La Plata and Buenos Aires refineries.

**Another line started . . .** Work has already started on a 580-mile, 12-in. crude line from Campo Duran field in northern Argentina to San Lorenzo, a river port.

Fish Engineering Corp., of Houston, and other United States firms are jointly building the line as part of a $180-million contract.

Fish will start work in about 2 months on a 1,015-mile, 24-in. natural-gas line from Campo Duran to Buenos Aires.

YPF expects to launch another pipeline project soon when it asks for bids on a line from Mendoza Province. It also will start negotiations for a 2,600-bbl. lubricating-oil plant to be built at Rosario.

The agency has 60 to 65 rigs running in its exploration and development program. It purchased 30 Ideco rigs last year. Ten have arrived in Argentina. Twenty more are being built in Italy by Nuovo Pignone, which is manufacturing the equipment under a license from Dresser Industries, Inc.

## Production Started

### by new group on Maracaibo holdings. Others are ready.

ONE NEW GROUP of Venezuelan oil operators is producing its new Lake Maracaibo properties and a second group of newcomers is about ready to start.

Venezuelan Sun Oil Co., Venezuelan Atlantic Refining Co., and Seaboard Oil Co. now have four good wells on its Block 1 concession. The group has an arrangement with Creole Petroleum to handle up to 12,000 bbl. daily at Creole's La Salina terminal until Sun's terminal on the west shore of the lake is completed. Sun is operator for the group.

Sun has two 19,000-bbl. barges working on the block. One is used as a floating flow station while the other shuttles back and forth to the La Salina terminal.

On the eastern edge of the lake, the group headed by San Jacinto Petroleum Co. is now testing a 12-in. pipeline from its Marlago field to storage the company has built at Cie. Shell de Venezuela's San Lorenzo terminal.

San Jacinto has four flush wells ready for production on the 1,967-acre national reserve block V-575 and is about ready to complete a fifth with 180 ft. of net oil sand. The latest well may be the best yet drilled on the concession.

San Jacinto is using a 10,000-bbl. barge as a floating flow station. The group hopes to load its first tanker by early next month. Douglas Oil Co. of California has contracted for the group's production on a long-term supply basis.

San Jacinto's partners in the operation are Union Oil Co., Murphy Corp., Monsanto Chemical Co., Tennessee Gas Transmission Co., American Petrofina, and Sharples Oil Corp.

## Concentric tubing:

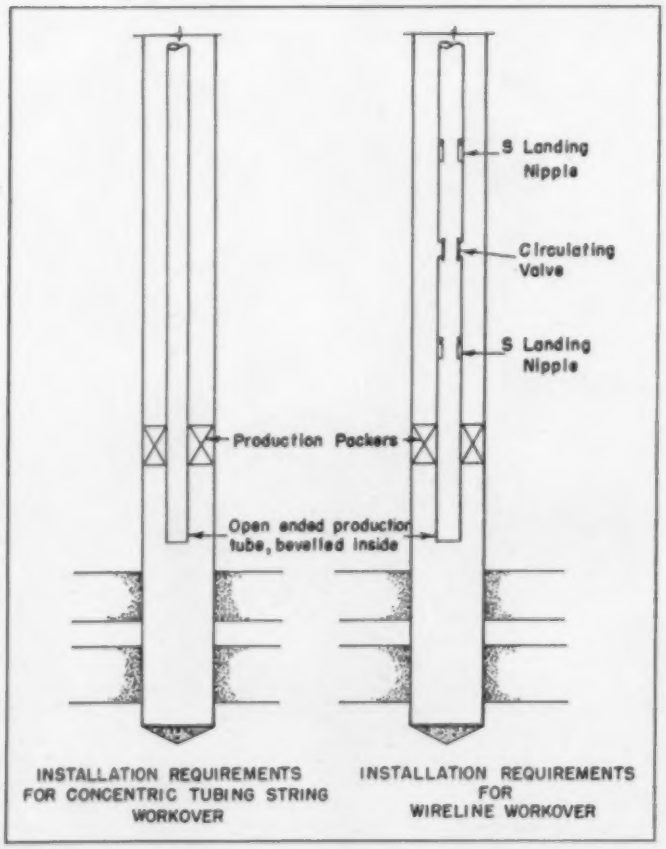
# A new concept for well workovers

**The author says . . .**

Small outside-diameter tubing used as a workover tool can become the most practical and cost-saving idea since the advent of permanent-type well completions. During 18 months, successful operations have included sand removal, squeeze cementing, displacement plug cementing, set-cement removal, sand control, acidizing, and combinations. Gulf has completed 71 jobs in the Louisiana Delta.

Sand removal was attempted in 58 jobs; only 8 failures were recorded. Fifty per cent of the successful well cleanouts resulted in restoration of production; and a net saving of $438,000. Nine successful plugbacks were completed in 11 attempts; this resulted in a net saving of $99,773.

BY R. J. GOEKEN
Gulf Oil Corp.


S Landing Nipple
Circulating Valve
S Landing Nipple
Production Packers
Open ended production tube, bevelled inside
INSTALLATION REQUIREMENTS FOR CONCENTRIC TUBING STRING WORKOVER
INSTALLATION REQUIREMENTS FOR WIRELINE WORKOVER

**GENERAL** tubing requirements for concentric-tubing workovers are similar to those for wire-line work. Notice that the tubing must be open-ended, full opening, and bottomed above all desirable completion intervals. Fig. 1.

GENERAL tubing requirements (Fig. 1) are similar to that for wire-line work. The tubing must be open-ended, full-opening, and bottomed above all desirable completion intervals. The wire-line-operated circulating device and landing nipples are not a requisite of concentric-tubing work. Exclusion of this equipment as a requirement of permanent-type-completion (PTC) operations would not only cut down installation costs but would also, in some instances, allow limited work in wells not originally equipped for PTC workovers. In wells with full-opening packers, but with bull-plugged production tubes, the tubing may be made open-ended with jet or with chemical tubing cutter to allow concentric tubing operations.

**Tools . . .** The equipment essential to concentric-tubing workovers is:

1. **A tubing string of sufficient length and clearance to run concentrically within the producing string to the desired depth.** All concentric-tubing workovers in Gulf's operations have utilized ¾-in. EUE J-55 tubing (Fig. 2). Only 4 tubing failures have occurred during the past 71 jobs.

2. **Blowout-prevention control must be provided.** Blowout-preventer equipment for ¾-in. tubing work (Fig. 4) consists of one hand-operated 2½-in. i.d. ram-type wire-line preventer equipped with ¾-in. pipe rams surmounted by a 2½-in. wire-line stripper. In service, an adapter flange is installed on the wellhead, and a space nipple of sufficient length is installed to mount the preventer equipment above the top circle of the well guard. In this manner, the well guard may be used to support the working platform and does not require removal prior to moving the work unit on location.

3. **A pulling unit complete with high-pressure pump, manifold, measuring tanks, and all necessary tools to run and to pull ¾-in., 1, or 1¼-in. tubing.** Existing units (company and contract) are double pipe-mast types. They are limited to the handling of tubing in singles. Larger contract units capable of pulling doubles will soon become available. Because of the high friction loss in small outside-di-

Paper (condensed) from spring meeting of Southern District, API Division of Production, under the original title, "Report on the Methods and Results of Concentric-Tubing Workovers."

ameter tubing work, a triplex pump or its equivalent is mandatory.

The cementing, well-logging, and perforating techniques developed by service companies for permanent-type well-completion workovers are utilized to the maximum in concentric tubing work. Permanent-type completion cementing units are used on all jobs if possible, inasmuch as the slurry characteristics and blend of admixes can be more closely regulated. Through-tubing perforating equipment includes 1¾ and 1⅜-in. swing-jet, link-jet, and capsule-jet perforator. Through-tubing combination gamma-ray log and collar locator have also been advantageously used in concentric tubing work.

### Concentric-Tubing Workover Procedures

Before starting concentric-tubing work, an analysis of well conditions is made and the proposed operation evaluated as in any other PTC workover. Here, problems peculiar to this type work are encountered, and a solution must be foreseen before attempting through-tubing work. Well installations must meet specific requirements.

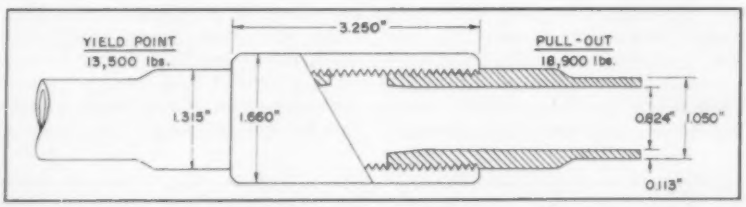
Wire-line tools are used to the fullest extent prior to concentric tubing workovers. A wire-line tubing gage ascertains tubing bore and conditions and determines the presence of sand bridges. Circulating sleeves or side-pocket mandrels are blanked off if required.

**Sand removal . . .** Removal of produced sand from tubing and well bore was the first application, and has been the principal use of the tool. The majority of applications involve ¾-in. tubing concentric within 2-in. tubing and use salt water as the circulating fluid. The ¾-in. tubing is equipped with a mule-shoe joint on bottom. Because of the high pressure-low volume characteristic of the circulating system as imposed by the high friction loss of the small o.d. tubing, a high-pressure triplex pump is required. Average pumping requirement at 8,000 ft. is 2,500 psi. pump pressure with a circulating rate of 15 g.p.m.

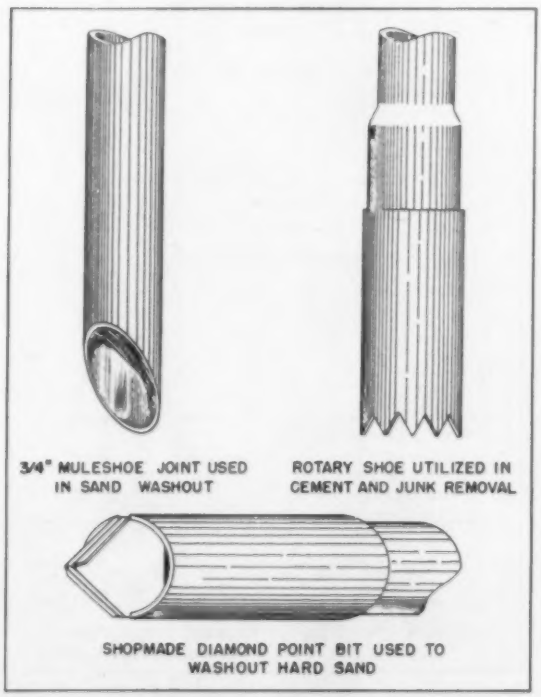
During sand-washing operations, the ¾-in. tubing is jetted into the sand bridge, and sand is carried in suspension into the ¾-in.-2-in. tubing annulus. After approximately 40 to 60 ft. of sand is washed, the blowout preventer is closed, and the sand is reverse-circulated from the well (Fig. 5). In this manner, the hole is reversed clean on every second connection. Sand removal is continued until the hole is washed to the desired depth.

The high pump pressures imposed upon the formation during reverse circulation have at times resulted in loss of returns. The loss of salt water into the formation through the perforated interval in most instances carries the sand into the cavity behind the casing. If sand is still evident, circulation is maintained down the ¾-in. tubing to relieve the back pressure imposed on the formation and complete sand removal. The average sand-washing rate computed from 16 successful jobs was 68 ft. per hour.

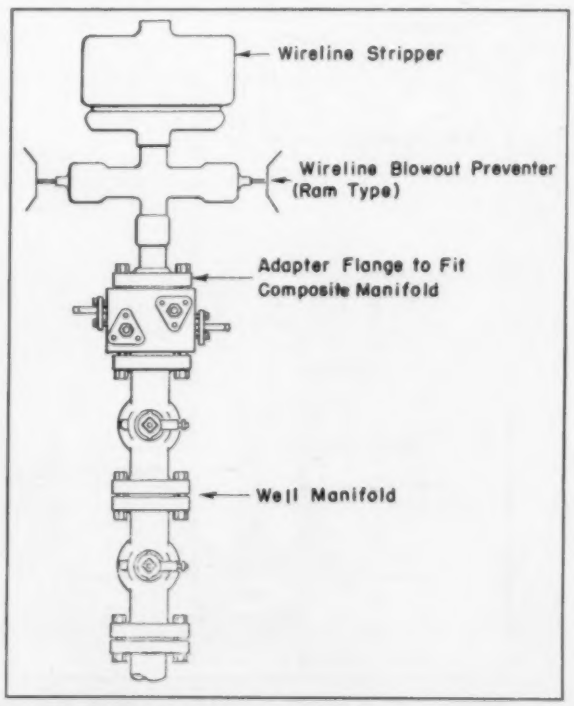
Operating techniques in sand washing with ¾-in. tubing are variable and dependent upon the well conditions. Hard sand bridges which have defied removal by bailing or PTC methods have been successfully removed by spudding or rotating through the hard crust and circulating out with ¾-in.




**GULF OIL** has used ¾-in. EUE J-55 tubing. Only one failure resulted from threads parting in 71 jobs. Fig. 2.


3/4" MULESHOE JOINT USED IN SAND WASHOUT
ROTARY SHOE UTILIZED IN CEMENT AND JUNK REMOVAL
SHOPMADE DIAMOND POINT BIT USED TO WASHOUT HARD SAND

**HERE ARE** the various types of bits that were used in ¾-in.-tubing workovers. Fig. 3.




**BLOWOUT-PREVENTION** control is essential. Here, the well guard may be used to support the working platform. Fig. 4.

**"The unusual success of ¾-in. tubing as a well-cleanout tool led to an investigation of broadening its application to other phases of well workovers. Squeeze cementing with ¾-in. tubing has been limited . . . to plugbacks. A set-through cement job has not been attempted."**

tubing. The positive well control afforded by the blowout-preventer arrangement allows removal of sand entering the well bore as a result of natural flow. Thus, sand may be produced and exhausted from the interval without removal of the ¾-in. tubing from the well bore. Shale, as well as sand, has been effectively recovered from wells.

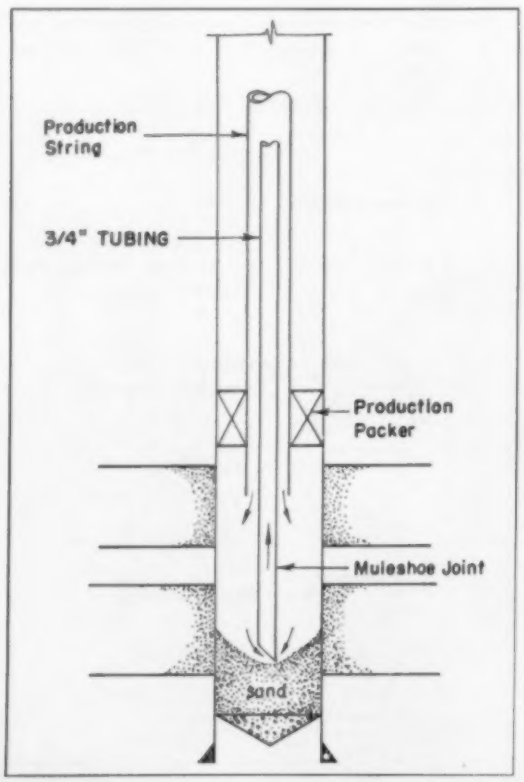
We anticipated trouble in using ¾-in. tubing for removal of sand in 2-in. tubing. Sticking or plugging of the small outside-diameter pipe as well as failures caused by rupture or thread parting were expected. The past work, however, has shown remarkably few failures of this nature. Parted tubing was experienced in only four jobs; plugged ¾-in. tubing occurred in only four jobs; and in no instance has there been stuck tubing which required a conventional rig for recovery. Since the advent of sand removal using ¾-in. tubing and during the succeeding 18-month period, a total of 58 wells have been cleaned out. Of this total, 24 jobs resulted in restored production, 26 wells were successfully cleaned out but failed to restore production, and 8 jobs were considered failures. The failures were due primarily to crooked or mashed tubing and to obstruction such as wire-line tools in the tubing string.

**Squeeze cementing . . .** The unusual success of ¾-in. tubing as a well-cleanout tool led to an investigation of broadening its application to other phases of well workovers.

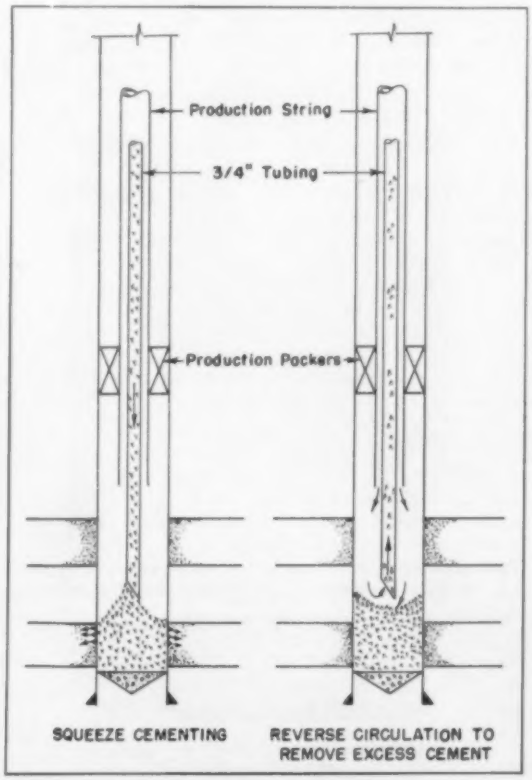
This was effected in the successful completion of a plugback job in February 1957. Squeeze cementing with ¾-in. tubing has been limited to date to plugbacks. A set-through cement job has not been attempted. Nevertheless, reconditioning of a completed interval is believed not beyond the scope of this tool.

Techniques and services developed in wire-line PTC work have been used in ¾-in. tubing workovers. A modified lightweight cement is used and mixed with a batch tank mixer to assure uniform slurry and weight. In lieu of a batch tank mixer, the slurry may be circulated through the pump and tank until a uniform mixture is attained. Small slurry volumes, not greater than 12 bbl., are generally used and have been found adequate in most cases. Volume requirements above 12 bbl. are completed by stage cementing.

To aid removal of sand a mule-shoe joint is run on the ¾-in. tubing string in plugback operations. The ¾-in. tubing is bottomed at the projected top of the cement plug, and the cement slurry is pumped down the ¾-in. tubing. Upon displacement of the ¾-in. tubing with cement, the blowout preventers are closed and the cement squeezed into the formation. Once the desired squeeze pressure is attained, the excess cement is reversed from the well and the ¾-in. tubing pulled approximately 30 ft. above the new plug. An illustration of squeeze cementing is shown in Fig. 6. Gener-




**DURING SAND-WASHING OPERATIONS,** sand is carried into the annular space, the blowout preventer closed, and the sand reverse circulated. Fig. 5.




**IN SQUEEZING** cement slurry is pumped down the ¾-in. tubing, blowout preventers closed, and the cement squeezed into the formation. Fig. 6.

ally, 1,000-psi. pump pressure is maintained on the well after cutting the plug and clearing the tubing of excess cement. The plug is tagged, tested, and the ¾-in. tubing pulled after setting a minimum of 12 hours.

Flugback jobs in formations which cannot be pumped into are completed by the displacement-plug method. The ¾-in. tubing is bottomed near the existing plug and the required volume of cement displaced into the well. On completing the displacement, the ¾-in. tubing is pulled clear of the plug and reverse circulation established to clear the tubing. The ¾-in. tubing is then lowered to the projected top of the plug, and reverse circulation is attained to assure clearance of the well bore to the proposed depth. This sequence is illustrated in Fig. 7.

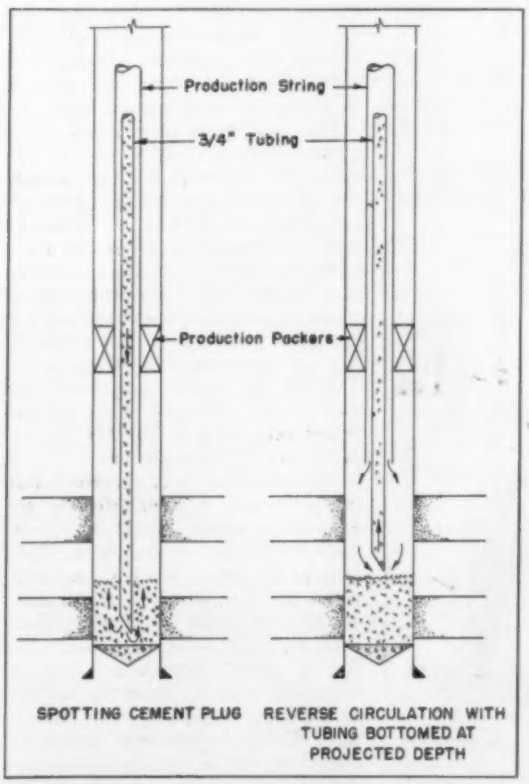
Squeeze pressures incurred in ¾-in. tubing plugbacks are not limited by the pressure rating of the casing as is the case in wire-line squeeze cementing, inasmuch as all pressures are contained within and below the tubing string. Plugback operations have been successfully completed in wells equipped with retrievable production packers as well as retainer production packers. However, casing pressure is maintained as added assurance to prevent unseating of the packer or to avert crooked tubing. Maximum squeeze pressures have varied from 2,000 to 2,700 psi. pump pressure.

**"Removal of a set-cement plug placed inadvertently too high in the well bore has been achieved by the use of acid through steel tubing with telescoping joints, and wire-line tools with special bits have been used to remove cement filter-cake buildup in perforations."**

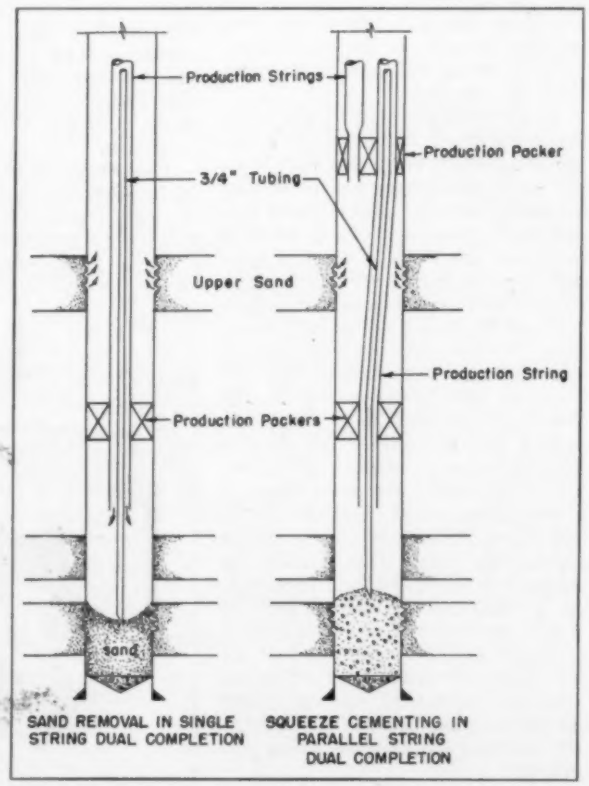
**Set-cement removal . . .** The problem of set-cement removal has increased the complexity and, in some instances, has resulted in the failure of wire-line workovers. Removal of a set-cement plug placed inadvertently too high in the well bore has been achieved by the use of acid through steel tubing with telescoping joints, and wire-line tools with special bits have been used to remove cement filter-cake buildup in perforations. These methods have proved time-consuming and in some instances ineffective.

Set-cement removal using ¾-in. tubing techniques was recently completed in a well equipped with 5½-in. o.d. casing and 2-in. tubing. A diamond-point, shop-made bit was run on ¾-in. tubing to the top of the cement plug, and inhibited super mud acid was pumped into the tubing. Using air tongs, the ¾-in. tubing was rotated slowly with no perceptible weight applied on the bit. The acid was circulated down the ¾-in. tubing while rotating; and, upon displacement of the tubing volume, reverse circulation was established to wash the well bore. This procedure was repeated four to five times until the acid was spent. The spent acid was then discarded and a fresh volume spotted for further washing.

A total of 2,500 gal. of acid was used in drilling 164 ft. of set cement. Average penetration rate for the entire job (40 hours) was 4.1 ft. per hour. However, actual penetration rate while drilling was computed to be 30 ft. per hour. A calculated volume of 15¼ gal. of acid was required per foot of cement removed, or 500 gal. of acid would remove approximately 33 ft. of cement. Removal of the ce-




**HERE IS HOW** Gulf handles plugbacks in formations which cannot be pumped into. This method has been used successfully in nine wells. Fig. 7.




**GULF HAS WORKED** over the lower zone in 20 single-string dually completed wells. In no case was any damage done to the upper zone. Fig. 8.

**"The dollar saving of concentric-tubing workovers is exemplified in the ease with which dually completed wells have been worked over. Workover of the lower zone has been completed in 20 single-string, dually completed wells."**

ment was considered complete inasmuch as through-tubing perforating equipment recorded all casing collars, and no difficulty was experienced in reaching perforating depth.

**Sand control . . .** The exclusion of formation sand is a problem characteristic of many wells in the Louisiana Delta. In many instances the primary removal of sand has afforded restored production with little resanding of the well bore. As an example, 35% of the wells cleaned out have continued to produce as sand-free wells. There are wells, however, which exhibit extreme resanding tendencies. These wells require sand control if continuous production is to be maintained. The mechanical means of sand control applicable to ¾-in. tubing workovers are sand-lock and sand-consolidating plastics.

**Sand lock . . .** This process incorporates graded plastic-coated walnut shells pumped into and placed adjacent to the formation, using jelled oil as a carrying agent. The plastic coating bonds the hulls into a tight permeable network in the perforations and in the cavity between the sand face and the casing.

The sand-lock process was completed in the lower completion of a single-string dually completed well. With the ¾-in. tubing bottomed at the base of the perforations, plastic-coated walnut hulls preceded by diesel oil were displaced down the ¾-in. and spotted opposite the perforated interval. Walnut hulls concentrated in slurries of ⅛ to ¼ lb. per gal. were squeezed into the formation until a "screen-out" pressure was reached. The well bore was cleaned by reverse circulation, and a second stage of walnut-hull slurry was squeezed into the formation. During squeeze operations, the ¾-in. tubing was reciprocated as a precaution against plugging or sticking. However, rupture of a pump line during the final stage resulted in plugged ¾-in. tubing and necessitated a round trip to clean out the well bore. The well was then shut in long enough to allow consolidation of the plastic-coated walnut shells. Completion in the treated interval failed; nonetheless, the mechanical aspects of the sand lock job were considered successful.

**Sand-consolidating plastics . . .** The advantages offered by ¾-in. tubing techniques and the recent developments in low-viscosity plastics prompted the use of the technique with sand-consolidating plastic in an attempt to control the sand production of a singly completed well. All pretreatment fluids and plastic were displaced down the ¾-in. tubing and spotted in the perforations prior to actual treatment of the formation, thus preventing contamination of the formation with workover fluid. During treatment, successive stages of plastic were squeezed with the required shut-in time allowed between stages. A total of 300 gal. of plastic squeezed out in two stages; lease crude was used as an over-flush between stages.

**Acidizing . . .** Mud-acid treatments to dissolve clay and silt in sand formations and to remove mud blocks in screens have been used with varying degrees of success in well stimulation. Well treatments which did not disturb the production string but which utilized the packer as a squeeze tool have been completed. However, this method of well treatment has apparent disadvantages. Well fluids or workover fluids present in the tubing are squeezed ahead of the acid, and thus actual treatment may be confined to the more permeable sections of the formation.

The ¾-in. tubing technique has been effectively used as an acidizing tool. The ¾-in. tubing is bottomed below the producing sand to allow circulation of acid past the face of the formation. Sufficient acid is spotted to cover the entire screen or perforated section and allowed to pervade the formation for 15 to 20 minutes. The spent acid is then displaced with a fresh batch and allowed to permeate for an additional 15 to 20 minutes. The remaining acid is then pumped into the formation to complete the job.

Four wells have been chemically treated utilizing the technique of ¾-in. tubing. The operations have resulted in increased productivity from two wells.

**"Take a tip from an old timer—don't go lightin' a cigarette offa' those things."**

### Economics and Advantages

Concentric-tubing workovers have been applied to 71 jobs at the present time. Sand removal, by far the most common application, accounted for 58 jobs and resulted in the successful cleanout of 50 wells. Of this number, 24 wells were successfully restored to production and 20, or 35%, continued to produce as trouble-free wells. The average cost of a single well cleanout has been $1,420. Based on an estimated conventional workover cost of $10,000 for singly completed wells and $15,000 for dually completed wells, a net saving of $438,000 is estimated for the 50 successful well cleanouts. Because of the small number of well cleanouts accomplished with wire-line tools in this area, a comparative cost is not available.

Plugbacks have been attempted in 11 wells with 9, or 82%, having been completed successfully. The average cost of a concentric-tubing plugback operation was $3,611 as compared with an average cost of $6,000 for a wire-line plugback. The minimum cost to complete a concentric-tubing plugback was $2,359 and the job was completed in 3 days. The estimated average conventional workover cost is $15,000 for singly completed wells and $20,000 for duals. Thus, an estimated net saving of $99,773 was experienced in plugbacks alone.

The dollar saving of concentric-tubing workovers is exemplified in the ease with which dually completed wells have been worked over. Workover of the lower zone has been completed in 20 single-string, dually completed wells. At no time was the upper zone closed in or otherwise disturbed during actual operations. This is shown in Fig. 8. Reservoir damage to the upper zone frequently encountered during conventional dual workovers, as well as the production loss during the workover period, was excluded or reduced to a minimum with ¾-in. tubing techniques. **End.**

# Cold-weather vapor-lock control

## *through sacrifice in ease of engine starting*

BY OSCAR C. BRIDGEMAN
AND ELIZABETH W. ALDRICH
Phillips Petroleum Co.

A KEY THEME of many prewar volatility papers was the traditional conflict between the ability of a motor fuel to give easy engine starting at low ambient temperatures and at the same time avoid the occurrence of vapor lock at higher ambient temperatures. In particular, the problem was most acute in the spring season where extreme variations in ambient temperature were most likely to occur.

For example, in March the minimum temperature on record in Minneapolis is −27° F. and the maximum on record is 83° F. Ease of engine starting on a cold morning requires high front end volatility on the ASTM distillation curve, which in turn means that the motor fuel has a high value of Reid vapor pressure. Hence as the ambient temperature rose during the day, or as the season progressed, the tendency toward vapor lock became more pronounced.

Prewar, vapor-lock control was given major emphasis in motor-fuel marketing specifications at the sacrifice in ease of engine starting. This same situation prevails today, though possibly not to such a marked extent as in prewar days.

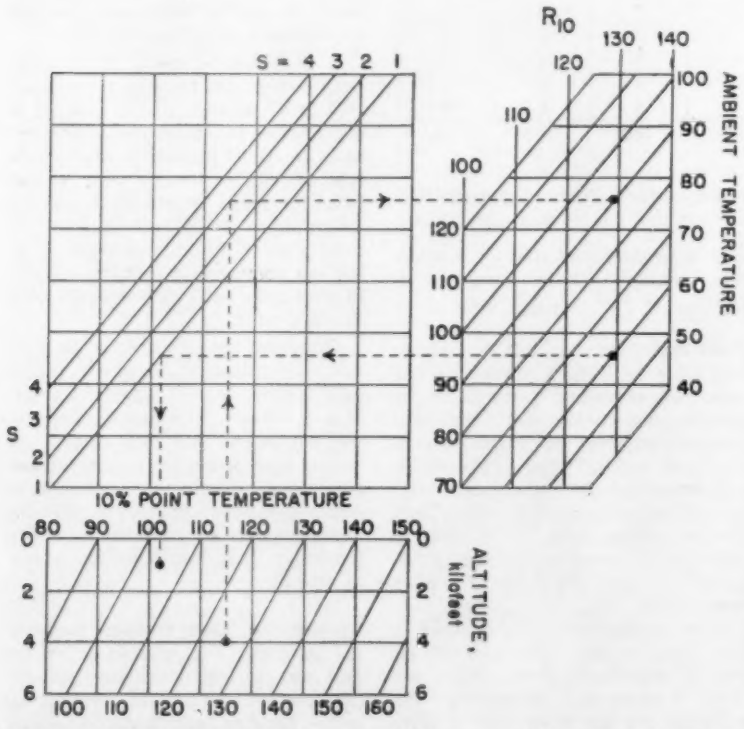
**Making starting easier . . .** Ease of engine starting depends upon a number of variables. With a given fuel, higher engine-cranking speeds favor ease of starting and there have been considerable postwar improvements along this line. Better batteries and electrical systems permit application of higher cranking torque in overcoming the drag of the viscous oil in the engine. Also the widespread marketing of 5W motor oils in northern latitudes, and of multiviscosity oils in all sections of the country, has helped to reduce low-temperature viscous drag.

### The authors say . . .

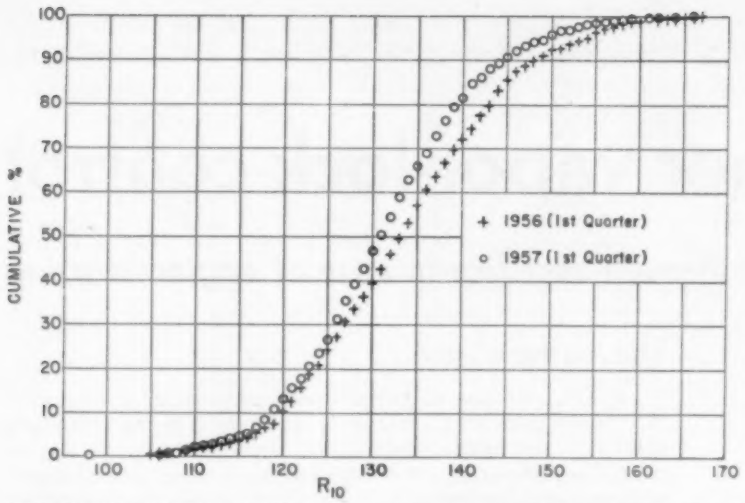
• The extremes in temperature variations in cold-weather months are such that a choice is necessary between vapor-lock control of motor-fuel characteristics, accompanied by sacrifice in ease of engine starting, or effective engine starting without regard to vapor-lock problems.

Analysis of Ethyl Corp. survey data for the past 3 years clearly indicates that the first of these two choices determines current marketing practices, even as it did in prewar days. In other words, vapor-lock control is overriding and ease of engine starting becomes increasingly poorer as minimum ambient temperatures drop.

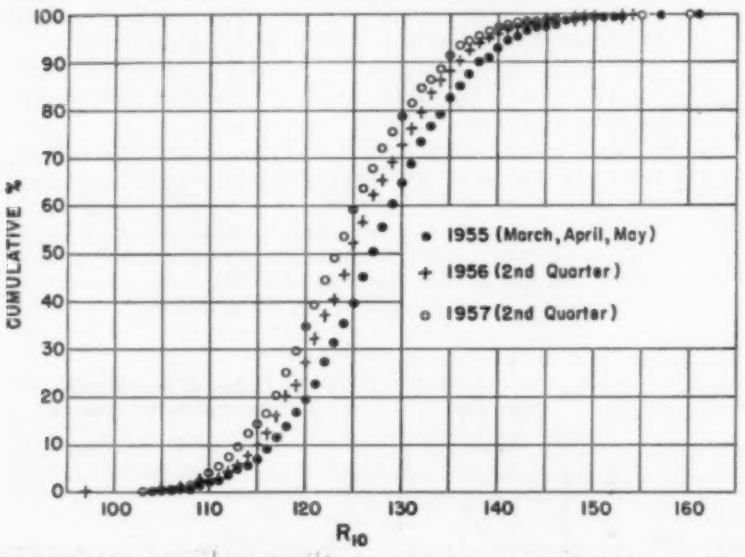
• In general there is a tendency to employ more drastic vapor-lock control in cold weather than during the spring and summer seasons, which unnecessarily penalizes ease of engine starting. A chart is presented which permits evaluation of the fuel characteristics for optimum ease of engine starting, compatible with any selected degree of vapor-lock control maintained uniformly throughout the year in any given locality.




**PERFORMANCE RATING CHART** for engine starting, vapor-lock limited. Fig. 1.




**PERFORMANCE RATING VALUES** for two winter seasons, 1956 and 1957. Fig. 2.




**PERFORMANCE RATING VALUES** for three spring seasons, 1955, 1956, and 1957. Fig. 3.

although further improvements along this line are possible.

Again, with a given fuel, increase in mixture supplied by the carburetor during engine starting favors ease of starting, since it reduces the time required to build up the first explosive mixture in the engine cylinders. Automatic chokes have provision for automatic increase in richness of mixture as the ambient temperature drops, and this is of very material help in engine starting when the choke is properly adjusted.

Finally, it has become common practice to pump the accelerator during engine starting. At each stroke a small volume of fuel is injected into the intake manifold, thereby increasing the richness of the mixture and improving the ease of starting. However, if excessive use of the accelerator is required in starting, over-all fuel economy will be adversely affected.

**Fuels important . . .** Fuel characteristics likewise have a marked effect upon ease of engine starting. As the ambient temperature decreases, it is necessary to lower the temperatures at the front end of the ASTM distillation curve in order to maintain comparable ease of engine starting. Thus, on the average, each 10° F. drop in ambient temperature requires a decrease of about 10° F. in 10% point temperature.

Ease of starting is also affected by the slope of the front end of the ASTM distillation curve, with a low slope favoring ease of starting. For example, for the same ease of starting at 20° F. ambient temperature, a fuel having a 10% point slope S = 1 can have about a 13° F. higher 10% point than a fuel for which S = 4. As the ambient temperature decreases, the effect of slope becomes less pronounced.

Well-defined relations are available from which it is possible to develop a rating system for engine starting based on the 10% point temperature of the fuel and its 10% point slope. However, when such ratings are evaluated for commercial fuels marketed over a period of 1 year or more, it is found that little attempt has been made to provide comparable ease of starting at all ambient temperatures. In other words, the ease of engine starting with commercial motor fuels becomes increasingly poorer as the minimum ambient temperature decreases.

The evidence is very clear from a study of the Ethyl Corp. survey data over the past 3 years that front-end volatility is controlled by vapor-lock considerations and not by engine starting considerations.

It can readily be demonstrated why vapor-lock control is the overriding consideration, through detailed analyses of ambient temperatures in various localities. For the present purpose, it suffices to point out that the national average seasonal change in maximum ambient temperature is about 33° F., as compared with about 61° F. for the national average seasonal change in minimum ambient temperatures, or a ratio of 1.85.

If provision is made for a comparable degree of freedom from vapor lock at all seasons of the year, it is not feasible to adjust fuel characteristics so as to provide a comparable ease of engine starting over almost twice the range in minimum ambient temperature. Wide variations in this ratio occur in different localities, making the compromise problem simpler in some cases and much more complex in other cases.

However, the conclusion is clear that it is necessary to exercise vapor-lock control in cold weather as well as hot weather, with existing automotive equipment, and such control penalizes ease of engine starting at low ambient temperatures. Under these conditions, optimum starting performance can only be achieved by riding the vapor lock borderline as closely as possible.

**Comparable vapor-locking tendency . . .** In view of this analysis, it follows that any realistic evaluation of the performance ratings of commercial motor fuels as regards starting ability must take vapor-locking tendency into

consideration. In other words, the basis of reference is not comparable performance as regards engine starting at all ambient temperatures. Instead, it is necessary to employ comparable vapor-locking tendency as the imposed basis of reference.

Hence, a rating system for engine-starting performance becomes in reality a rating system for vapor-lock control, although it is possible to employ the fuel variables characterizing engine starting, namely 10% point temperature and 10% point slope. On the other hand, the anomalous situation arises that it is necessary to use maximum rather than minimum ambient temperatures.

### Rating Chart

On this basis, a performance-rating chart for engine starting (vapor-lock limited) is shown in Fig. 1. The right-hand field covers the effect of ambient temperature, which is taken as the highest on record for the particular locality and time of year. The lower left-hand field covers the effect of altitude, whereas the intermediate field covers the effect of 10% point slope S. The vertical lines in the right-hand field represent $R_{10}$ performance ratings, namely the equivalent ratings at constant vapor-locking tendency under the reference conditions of sea level altitude, 100° F. ambient temperature, and 10% point slope S = 2.

The chart may be used either to evaluate $R_{10}$ ratings for commercial fuels of known characteristics marketed in a given locality, or it may be used to develop marketing specifications for different localities or different seasons of the year, based on a preselected value of $R_{10}$.

Two examples will make clear the manner of using the vapor-lock limited engine-starting chart. A fuel with a 10% point temperature of 125° F. and a 10% point slope S = 3 is marketed at an altitude of 4,000 ft. and an ambient temperature of 90° F. By following the line shown on Fig. 1, it is seen that $R_{10}$ = 129. If it is now desired to know the equivalent 10% point temperature for S = 1, altitude equal to 1,000 ft., and ambient temperature equal to 60° F., the value from Fig. 1 is seen to be 104° F.

Employing the equations underlying the chart, values of the performance rating $R_{10}$ were computed for the 9,686 commercial motor fuels sampled in the Ethyl Corp. motor-fuel surveys for the past 3 years. Without making distinction between regular and premium motor fuels, the distribution of $R_{10}$ values for the two winter seasons is shown in Fig. 2 and for the three spring seasons in Fig. 3. In both cases, a strong trend is observed in the direction of improved ease of engine starting.

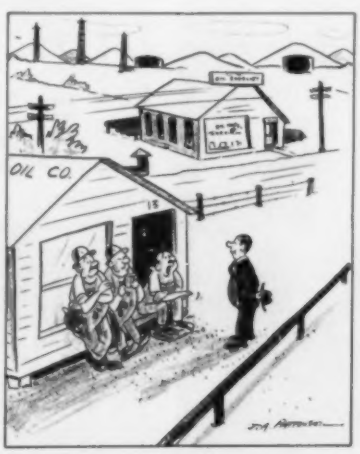
**TABLE 1**
**Percentage of Values at or Below the Stated $R_{10}$ Levels**

| | $R_{10}$ =110 | $R_{10}$ =120 | $R_{10}$ =130 |
|---|---|---|---|
| Spring 1955* | 1.9 | 19.4 | 64.6 |
| 2nd Qtr. 1956 | 2.2 | 27.3 | 72.9 |
| 2nd Qtr. 1957 | 4.1 | 34.3 | 78.0 |
| Summer 1955† | 4.5 | 27.7 | 71.5 |
| 3rd Qtr. 1956 | 3.7 | 27.2 | 72.5 |
| 3rd Qtr. 1957 | 4.7 | 29.3 | 78.5 |
| Fall 1955‡ | 0.7 | 7.5 | 34.4 |
| 4th Qtr. 1956 | 0.1 | 3.7 | 30.8 |
| 4th Qtr. 1957 | 0.0 | 5.0 | 31.6 |
| 1st Qtr. 1956 | 0.8 | 9.7 | 39.4 |
| 1st Qtr. 1957 | 2.1 | 13.0 | 46.1 |

*March, April, May. †June, July, August. ‡September, October, November.

Information on the distribution of $R_{10}$ values for the four seasons is summarized in Table 1. The discontinuity in the fall season is due presumably to the difference in months of sampling in 1955. On the other hand, both the fall and winter seasons show very low percentages of $R_{10}$ values below 130, as compared with the other two seasons. This same type of situation was observed previously[1] in connection with the study of vapor pressure levels. It is indicative of the fact that refiners in general have been providing a more drastic vapor lock control in the cold weather months than during the spring and summer seasons.

This is particularly disturbing in the present instance since it constitutes an unnecessary restriction on ease of engine starting in cold weather. In other words, maintenance of a uniform degree of vapor-lock control at all seasons of the year would result in marked improvement in cold-weather engine starting.




**"Yep, Stranger, to drill for oil, you need a left-handed monkey wrench. Then you need a pair of heavy-duty sky hooks. Then,—"**

While no precise relationship exists between the vapor-lock control rating $R_V$ and the engine-starting rating $R_{10}$, an $R_V$ value of 11 corresponds to an $R_{10}$ rating of about 110 to 115. Hence an $R_{10}$ rating of 115 can be considered conservative, whereas a rating above 125 is ultraconservative insofar as protection against vapor lock is concerned since this corresponds to an $R_V$ value of about 9.

**It is concluded** from this analysis that vapor-lock control in cold weather mitigates against providing the same ease of engine starting in cold weather as at milder temperatures. Under these circumstances, the best performance possible as regards ease of engine starting can be achieved only if a consistent degree of vapor-lock control is maintained throughout the year. This is not being done in many cases, with the result that ease of engine starting in cold weather is being unnecessarily penalized.

### Reference

1. "Vapor Pressure Trending Upward," by T. W. Legatski, O. C. Bridgeman and E. W. Aldrich, The Oil and Gas Journal, Feb. 3, 1958, p. 93.

## Summer Course in Distillation Offered

AN INTENSIVE course, "Advances in Design and Operation of Distillation and Absorption Equipment," will be given at University of Michigan, July 7-16, 1958. It is for young men who wish to have a good start in the field as well as for experienced engineers wishing to learn of the most recent research results and mechanical developments related to vapor-liquid separation processes.

The topics include tray layout considered from transfer-rate and hydraulics viewpoints, efficiency predictions based on latest research programs including that of the American Institute of Chemical Engineers, new types of trays, application of computers including the use of the university's IBM 650 as well as equilibria, physical properties, trouble shooting, auxiliaries and component layout. Fee is $200.

The course, limited to 35, will be taught by James A. Davies, The Texas Co., New York, Profs. Brymer Williams and Kenneth F. Gordon, both of the department of chemical and metallurgical engineering, University of Michigan, Ann Arbor. Correspondence may be sent to Professor Gordon.

# How to control slurry density

## *during cementing operations*

**New densitometer not only measures the exact density of the slurry being pumped into the well, with an accuracy of 0.1 lb. per gallon, but provides a continuous record of slurry density throughout cementing job.**

BY J. P. MORAN
AND D. G. HARTWEG
Dowell Incorporated

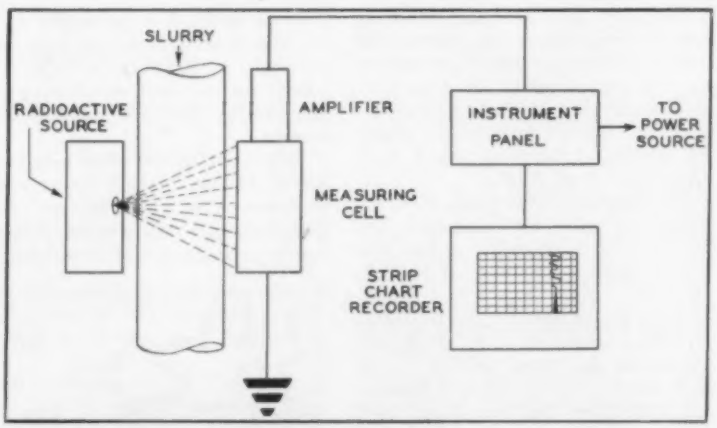
THE SUCCESS of oil-field cementing operations, whether for completion or remedial purposes, is a vital factor in determining the well's future productive life and the eventual return on the well owner's investment. Because the cement : water ratio (as indicated by the slurry density) largely influences the physical properties of both the slurry and the final set cement, control of slurry density during cementing operations becomes extremely important.

A paper presented at the spring meeting, Southern District, API Division of Production, Houston, under the original title, "Continuous Density Recordings During Cementing Operations."

A certain amount of water loss, or dehydration, takes place while a cement slurry is placed in a well. The extent of dehydration depends upon the porosity of the formations which it contacts; the differential pressures involved; and the slurry's original water content. In general, the more water a slurry contains, the more it can lose before it becomes too thick to pump. The slurry's initial water content is usually controlled to provide a viscosity of between 10 and 20 poises. Results show that this range yields maximum slurry pumpability.

The amount of water required to produce this viscosity varies with the type and brand of cement. Recent developments in slurry formulation involve using fluid-loss additives in the slurry to maintain the proper solid to water ratio at all times to insure against premature dehydration, to provide reliable pumping time, and to

Fig. 1




THE CHART, AND HOW THE INSTRUMENT WORKS

Fig. 2

**DENSITOMETER CHART** (Fig. 1, left) shows the slurry density throughout the entire cementing operation. Basically, the instrument is fairly simple (see Fig. 2 above). Energy from a radioactive source passes through the slurry. Part of this radiation is absorbed by the slurry and this amount is proportional to the slurry density. The measuring cell and instrument are so arranged that slurry density is recorded directly on strip recorder.

assure the proper density of the cement in place.

Too much water lowers slurry viscosity. This in itself is not objectionable because it makes the slurry easier to pump and reduces friction losses in the well. However, too much water also lengthens cement thickening and setting times, thus requiring longer shut-in time following placement before the cement can be perforated. Too much water may result in shrinkage during setting. In addition, "pockets" of water separate out of the slurry behind the pipe, resulting in voids in the set cement. The ultimate strength of the set cement is also lessened.

A slurry containing too little water has high viscosity, which causes difficulties in proper placement. Such high viscosities result in "plug flow," in which the material exhibits flow properties more like a solid than a liquid. As a result, at high pump rates, increased friction and a tendency to channel behind the pipe occur. These are particularly detrimental when cement must be circulated between close-tolerance pipe and hole. Also, if the heavy slurry should pass a highly porous zone, or otherwise dehydrate more rapidly than expected, there is danger of flash set before the slurry has been properly placed. The thickness time and setting time are also shortened.

Aside from these extremes, it is undesirable to have large variations in slurry density, even within limits. Density variations cause considerable variations in thickening and setting times, making it difficult to predict the optimum waiting period before perforating operations.

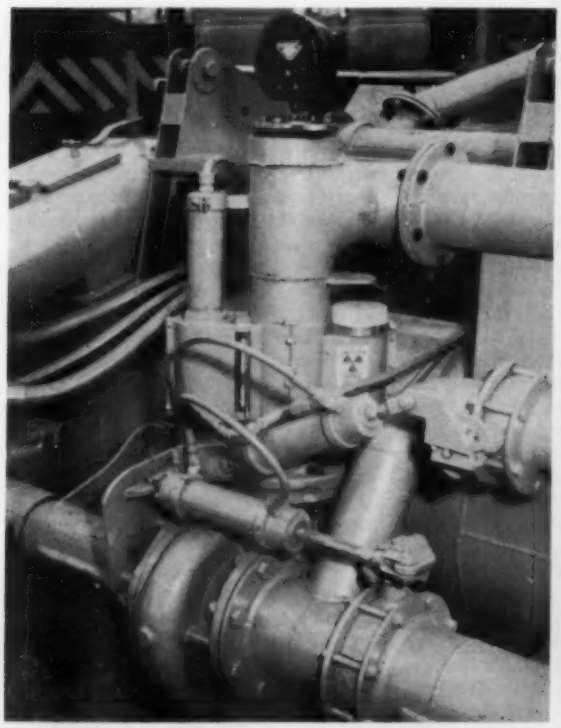
For best results, new cement should be perforated between the fnal setting time and before it reaches its ultimate strength. If too much time elapses and the set cement acquires high compressive strength, extensive shattering can occur with the resultant danger of communication into gas or water zones. In contrast, if insufficient time elapses and the cement is still mushy, the perforation may not remain open and producing formation may be sealed off from the well bore.

With the advent of deeper and deeper wells, requiring specialized cement formulations with critical solid to water ratios, slurry density must be closely controlled. If the cement job is to be successful and the set cement is to have optimum strength and sealing characteristics, proper slurry density is important to insure proper initial viscosity, pumpability time, and strength after a predetermined waiting-on-cement time. Such specialized cements must be mixed and applied properly, or expensive workover operations may be required later.

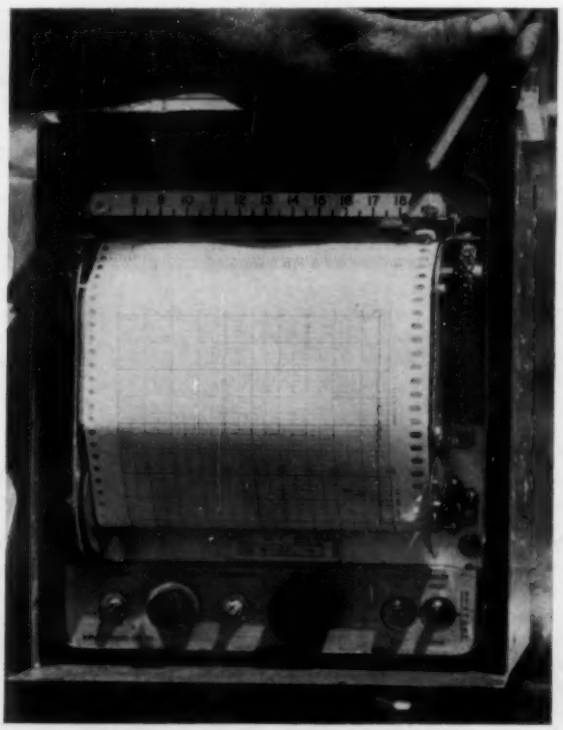
**Mixing equipment . . .** Cement slurries are mixed at the well site and applied to the well using mobile, high-powered blending and pumping equipment. Different designs have been developed in attempts to provide maximum application ease and slurry uniformity.

One method consists essentially of a hopper into which the dry materials are placed, with an eductor pipe at the bottom containing two jets which introduce water into the mixture. The first jet carries the cement out of the hopper into the eductor pipe, where the second jet provides further mixing and brings the solid : water ratio to the desired point. Slurry density control is accomplished by regulating water flow through these two jets. The mixture flows from the eductor pipe into a mixing tank for further blending, after which it is pumped into the well.

One of the difficulties in this type of mixing equipment is that variations in the type of cement or in the amount of air entrainment in the bulk dry cement result in density variations. Consequently, frequent sampling is re-



**DENSITOMETER UNIT** is installed on pipe carrying cement slurry. Radioactive source is on the right; detection cell is on the left. Fig. 3.



**THIS AUTOMATIC RECORDER** is calibrated to record densities from 8 to 18 lb. per gal. (Pencil points to slurry-density scale.) Fig. 4.

quired to check slurry density and make any necessary adjustments in water input.

Another mixing procedure utilizes two positive-displacement proportioning pumps, each capable of supplying 6 bbl. of water per minute. The proportioning pumps are connected by a PIV mechanical proportioner to cement screws, so that the water : cement ratio can be controlled quickly and easily by the cementing engineer. A single control increases water content and reduces cement content, or vice versa, as required. The water and cement are fed into a paddle mixing tank for uniform blending, after which they pass through a high-speed centrifugal pump that feeds the slurry into the high-pressure, positive-displacement cementing pumps. This unit has a maximum capacity of about 20 bbl. per minute. There is continuous slurry-density control throughout the job.

Control of slurry density has been further improved by using a new device known as a densitometer. This instrument not only measures the exact density of the slurry being pumped into the well, with an accuracy of 0.1 lb. per gal., but provides a continuous record of slurry density throughout the treatment (Fig. 1). The cementing engineer thus maintains a constant check on the density of the slurry being pumped into the well, and can immediately adjust any variation in cement : water ratio. As a result, slurry density is more closely controlled and density variations are avoided. This method is naturally more exact than controlling the slurry only by periodic spot sampling and adjusting proportioning controls solely on the basis of the operator's experience.

Another advantage of the recording densitometer is that it enables the cementing engineer to alter the proportionate composition of the slurry almost instantaneously. Using densitometer readings as a guide, slurry density can be immediately altered from one predetermined value to another, and the correct cement : water ratio immediately adjusted to provide a sharp break from one density to another.

Many operators like to tail-in a long string job with neat cement to provide dense cement with high compressive strength around the shoe. The bulk of the cement around the casing can be a low-cost, weaker material which functions merely to fill behind the pipe. Many jobs have used this combination of materials. Using the densitometer control, a switch from a 13-lb. to a 15-lb. slurry is made quickly and accurately.

The continuous record made during the entire cementing operation provides a permanent record for the well file, indicating (when correlated with depths) the type of cement behind any particular section of casing. It also assures the producer that the cement job he received was exactly as desired. Such a permanent record acts as a valuable guide in case later remedial workovers are required.

**The densitometer . . .** The densitometer consists essentially of three elements—a radioactive source, a radiation detector, and an automatic recorder (Fig. 2). Briefly, gamma rays from the radioactive source pass through the cement-slurry stream. Part of this radiation is absorbed by the slurry. The unabsorbed portion is measured by a gamma-ray detection cell. The amount of radioactive energy absorbed by the slurry is proportional to slurry density. These readings are continuously recorded upon a strip chart calibrated to read directly in terms of slurry weight in pounds per gallon vs. time.

The radioactive source is a suitably shielded capsule of cesium-137, an isotope approximately 50 millicuries in amount (Fig. 3). This source is securely fastened to one side of a 5-in. pipe, through which the cement slurry passes from the paddle-mixer tank to the triplex pump. The detection cell is fastened to the opposite side of the pipe. Gamma rays from the radioactive source pass through the pipe and slurry, the unabsorbed quantity being detected at the measuring cell and recorded electrically on the strip chart. The greater the density of the cement slurry passing through the pipe, the more gamma rays are absorbed and the fewer reach the measuring cell on the opposite side.

Prior to the cementing operation, the shield is removed from in front of the radioactive source and the calibration checked by means of standardized, lead absorption plates. Any minor variation is easily corrected by control adjustment at this time. Once the calibration has been checked, the instrument is ready to function.

Readings are continuously recorded on a strip chart horizontally calibrated to give a direct reading in pounds per gallon (Fig. 4). This chart records densities from 8 to 18 lb. per gal., and has 100 divisions, each equivalent to 0.1 lb. per gal. This range includes all commonly used cement formulations. The chart can be driven at two speeds, depending upon the detail of measurement desired. It is divided vertically, 10 divisions to an inch, and can be driven at the rate of either 1 or 2 in. per 5 minutes. Density readings are accurate to within 0.1 lb. per gal. The readings on the chart are steady and free from fluctuation because of random emission characteristics of radioactive sources. This eliminates errors in reading or "mental averaging" of a fluctuating reading.

This apparatus is completely safe for operating personnel in the vicinity, if ordinary caution is observed. When not in use, the radiation source is completely surrounded by lead shielding. When in use, the path of the gamma rays is restricted so that only a negligible amount of radioactivity can escape. Normally, the radiation level within a 12-in. radius from the source is less than 4 milliroentgens per hour. For maximum safety, however, all personnel are cautioned to stay at least 3 ft. away from the radioactive source while it is in operation. The slurry does not become radioactive by the absorption of gamma rays.

This densitometer has numerous advantages. It is simple to operate in the field and does not require bulky apparatus or extensive wiring. Readings are direct, continuous, and automatic; and the cementing engineer knows at all times the exact density of the slurry he is pumping into the well. Density measurements are taken from outside the pipe, eliminating any restrictions to flow or cement buildup on instruments. Also, by eliminating the time and trouble of taking and testing spot samples, the time lapse between density checks is completely eliminated. Readings are continuous, and it is not necessary to shut down any pumps or interrupt the flow of slurry into the well. The equipment is rugged and dependable and the problems of mounting on mobile units have been overcome. This is probably the first occasion that radioactive measuring and recording equipment has been permanently mounted on a servicing truck.

These densitometer units have been in operation in the Texas Gulf Coast area for the past year. They have greatly facilitated cementing operations, enabling cementing engineers to maintain close control over slurry densities and avoiding cementing failures resulting from faulty slurry mixing. Producers have been very pleased with the densitometer's performance, and they like having a permanent, accurate record of the entire cementing job. Approximately 1,000 cementing jobs have been performed to date using this densitometer to control slurry densities. It is believed that better cement jobs have resulted from using this improved method of controlling slurry density. **End.**

## A new record—

# 15,868 ft. of 9⅝-in. casing

## . . . set by Phillips in West Texas. It's believed to be longest string of this size pipe ever run. It took some careful planning, as revealed here

BY ED McGHEE
District Editor

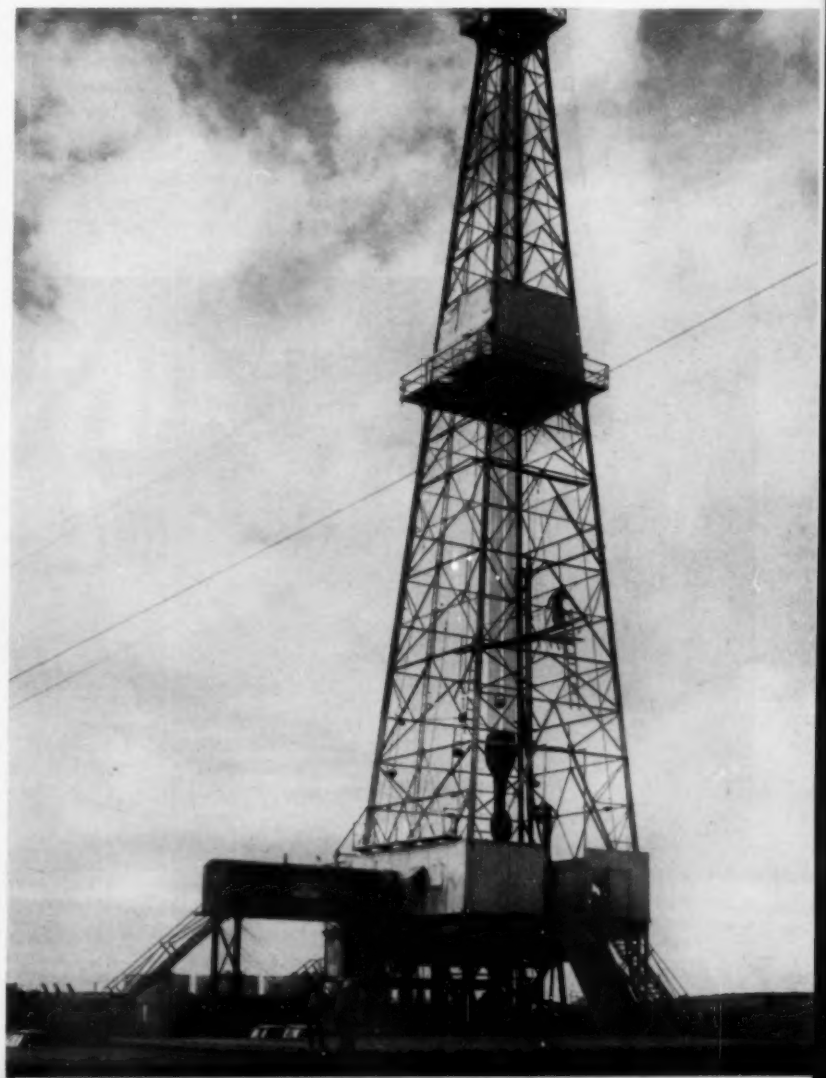
PHILLIPS Petroleum Co. and Sinclair Oil & Gas Co. 1-A Montgomery in Pecos County, Texas, is scheduled to drill to 23,000 ft. In preparation for drilling to that great depth, Phillips, the well's operator, has run 15,868 ft. of 9⅝-in. intermediate casing. This is, as far as is known, the longest string of this size pipe ever set in a well.

Careful preliminary planning paid off on this operation. The record-breaking job was done with little trouble. The pipe ran to bottom with no hangup and cement was displaced without incident. After the job, the plug was drilled, and an 8⅜-in. hole is now drilling below 17,236 ft.

**Good drilling time, too . . .** The 1-A Montgomery was spudded on July 11, 1957. A 12¼-in. hole was drilled to 2,410 ft. First, this hole was reamed to 17½ in.; later it was reamed out to 24 in. down to 1,850 ft. Here, 1,424 ft. of 20-in. pipe was run and cemented. Then, the 17½-in. hole was continued to 5,049 ft. where 13⅜-in. was cemented to the surface. This was on October 9, 1957.

A 12¼-in. hole was drilled to 15,868 ft. where an 8¾-in. rathole was taken on to 16,017 ft. At this point Phillips ran the record 9⅝-in. string and completed cementing it on January 30, 1958. Total time from spud until the 9⅝-in. had been cemented at 15,868 ft. was only 203 days. This time was almost exactly equal to the projection Phillips had made before spudding. Time lost in extensive reaming and in two minor fishing jobs was made up by fast drilling later on.

Although a caliper log run in the open hole showed moderate enlargement, the hole was in good condition. The ease with which casing ran proved this. Much of the credit for this good condition goes to the mud. It was a 10.3-lb. per gal. low-solids Driscose mud. Its viscosity was only



**OVER-ALL RIG** with 9⅝-in. pipe on rack as operator began to run pipe. Often the crews averaged a joint a minute through the rotary.

**AS WEIGHT INDICATOR** reached bottom: 650,000 lb., 15,885 ft. O. C. Rolls, lease foreman; Ted McKnight, district superintendent, and M. R. Hayes, division superintendent, Phillips Petroleum Co., stand beneath.

45 seconds. The drilling rig, Great Western Drilling Co.'s Rig 44, has 2-D-700 Emsco pump which had plenty of power to take full advantage of the good flow properties of the low-solids mud.

**Checking the pipe . . .** Table 1 is a summary of the pipe that made up the record string. Part of this pipe (the S-95 section) was hydrotested to 6,300 psi. after being threaded and coupled but before it was brought to the location. Once on location, the full length of each joint of this pipe was magnetic-particle inspected.

Also on location, the upsets on each end of every joint of the P-110 pipe were magnetic-particle inspected. And, each joint of the P-110 pipe was hydrotested to 5,000 psi. As a spot check, some of the previously tested S-95 pipe was retested at the same time to 5,000 psi. Further, the body of some of the P-110 pipe was spot checked with magnetic-particle inspection.

**PLANNING CASING JOB** in rig yard are: Herb Defenbaugh, division production superintendent, Sinclair; Elson, assistant division manager, Sinclair; Floyd Brett, vice president, Sinclair; Virgil Williams, pilot, Sinclair; Russell Hayes, division superintendent, Phillips; C. R. Fulton, of Halliburton.

**Rigging up to run pipe . . .** Rig 44 has a six-man crew. But, for the long string of pipe, Phillips brought in two complete casing crews. Moreover, two complete sets of all casing-handling equipment were brought to location. This included hydraulic tongs, air slips, and slip-type elevators.

A new 1⅜-in. drilling line was reeved especially for the job and 12 lines strung up.

Although the standard derrick has a nominal gross capacity of 1,250,000 lb., both it and the substructure were relegged for the job. Dry weight of the casing was to be 758,992 lb. and the relegging gave a safety allowance in case it was necessary to work the pipe on bottom. When all of the 15,868 ft. of casing was in the hole, it weighed 540,000 lb. with its 80% fill. When completely filled, the weight indicator registered the pipe at 630,000 lb. above the weight of the blocks, elevators, etc.

**Joint a minute . . .** Actually running the pipe was fast. At many times, the crews averaged putting a joint through the rotary every minute. But, over-all, total running time was 29 hours. The delay was caused by welding and filling. Careless welding can cause failure of the P-110 pipe. For that reason, Phillips took the precaution of preheating each spot to be welded on the P-110 to 400° F. Then, after it was welded, the metal was allowed to cool to 200° F. before being lowered into the hole. As a result, it took 6½ hours to run the first five joints.

These bottom five joints were welded together in four places spaced around the diameter at the joint. Also, the cement shoe and two fill shoes were welded. Purpose was, of course, to make sure that later drilling would not cause the lower joints to back off and come loose in the hole.

The casing was run until it touched the shoulder at 15,868 ft. and then was picked up with the full weight hanging on the elevators. Circulation broke easily and was maintained for 5½ hours with 1,200 to 1,500 psi. on the pumps.

Phillips had made no plans to reciprocate nor rotate the pipe after it got to bottom. As a result, the string

**RIG VIEW** with cementing and bulk cement storage units in foreground.

**RECORD-BREAKING 9⅝-IN. CASING STRING**

| O.d. (in.) | Weight (lb./ft.) | Type | Joints | Length (ft.) | Dry weight (lb.) | Safety factors: Tension | Collapse | Burst | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 9⅝ | 53.5 | P-110 Exline | 30 | 1,164 | 62,278 | 1.87 | High | Above one | All P-110 pipe tested on racks to 5,000 psi. All upsets and some of P-110 pipe body, magnetic-particle inspected. |
| 9⅝ | 47.0 | P-110 Exline | 19 | 775 | 36,848 | 1.75 | High | Above one | |
| 9⅝ | 43.5 | P-110 Exline | 132 | 5,443 | 239,511 | 1.75 | 1.32 | Above one | |
| 9⅝ | 47.0 | S-95 ST&C | 128 | 5,383 | 254,505 | High | 1.108 | Above one | Full-length magnetic-particle inspection. Hydrotested to 6,300 psi. before being brought to location. Spot checked on location. |
| 9⅝ | 53.5 | P-110 Exline | 77 | 3,072 | 165,850 | High | 1.111 | Above one | Bottom five joints, floats shoes, cement shoes welded. Preheated to 400° F. |
| Total | | | 386 | 15,847 | 758,992 | | | | |

carried no scratchers. However, there were centralizers on the bottom five joints of pipe and also above and below the second-stage cementing collar at 9,750 ft. A metal-petal basket was also spotted below second-stage collar.

**First-stage cementing . . .** Cement for the 9⅝-in. casing was stored in six bins on the location. Six cement trucks were used and two more kept on standby; the standbys weren't used.

In the first stage around the bottom, Phillips used a common cement with 40% Diacel D filler and 0.75% LWL water-loss-control agent. This slurry weighed 10.8 lb. per gal. and was followed by a batch of neat, slow-set cement to cover the lower portion of the casing and the shoe.

Total volume displaced in the first stage was 8,058 cu. ft. It included 1,700 sacks of common cement, 364 sacks of slow-set, 1,078 sacks of Diacel D, and 1,200 lb. of Diacel LWL.

From the time mixing started, it took only 58 minutes until all the cement was in the pipe. Then the top plug was inserted and this was followed by 410 bbl. of displacement water and the second-stage collar-opening plug. It took only 115 minutes from the time the second plug was put in until the second-stage collar opened.

In circulating out the excess cement on this first stage, Phillips didn't get full returns. However, some excess cement was circulated to the surface. And, after mud was conditioned at 10.5 lb. per gal., full circulation was regained.

When the first-stage cement took its initial set, the pipe was slacked off to find the neutral point. Then, some 100,000 lb. was let off and the well was ready for the second-stage cement job.

**Second-stage cementing . . .** The same surface setup was used for the second-stage job as for the first stage. To place cement all the way to the surface from the second-stage collar at 9,750 ft., a total of 5,090 cu. ft. was displaced. It required 1,050 sacks of common cement and 790 sacks of Diacel D to produce a 40% Diacel D slurry weighing 10.8 lb. per gal. Three hundred sacks of common portland cement were used around the stage collar.

It took only 33 minutes from the time mixing started to get all the cement into the pipe. Then, after the closing plug was inserted, it took only another 49 minutes to pump it down and shut off the second-stage collar. Cement circulated to the surface.

After the cement had set, the plug was drilled out with an 8⅜-in. bit and the 1-A Montgomery had completed a big hurdle on its way to 22,000 ft.

### Bibliography

"Great Western's Big Rig Flexes Its Muscles," The Oil and Gas Journal, September 9, 1957, p. 93.

Here Dowell engineer Bruce Wilson (right), Graham, Tex., goes over information on well with Joe McMahan (left), and Red Williams on a well in North Texas.

A Magcobar lab technician is shown here operating a high-pressure, high-temperature filtration unit for studying, under actual hole conditions, ways to control filtration.

Dr. H. K. van Poollen (right), Halliburton's laboratories, helped Oklahoma independent Charles Scott (left), set up a water-flood program. Center—Bill Richardson, geologist with Scott.

DRILLING

# How service

## They're a necessity to the little fellow

SERVICE COMPANIES today are an integral part of the oil business and perform many vital tasks for the oil operator. But their job goes beyond simply performing an operation at the wellhead. Service companies are constantly on the alert to provide their customers with better methods. These companies spend millions of dollars annually in research. They are constantly improving their equipment and techniques. The over-all result is a satisfied customer—the oil company—and in addition more new oil to bolster the nation's vital supply.

Research alone plays an important role in the behind-the-scenes activities of the service companies. Every service company in the business has some type of research program. These range from fundamental research in hidden laboratories to actual field tests.

But the service companies go beyond research. They provide their customers with many extra services that today are taken for granted. One of the best examples is in the logging of wells. Initially this service simply provided the operator with an electric log of the well bore. But here is what one drilling contractor had to say: "Just as soon as I run the log, I am off to town to check with the logging company's expert. He will advise me whether I should run casing or not and give me a detailed analysis of the various producing zones. This service is worth as much to me as the log itself."

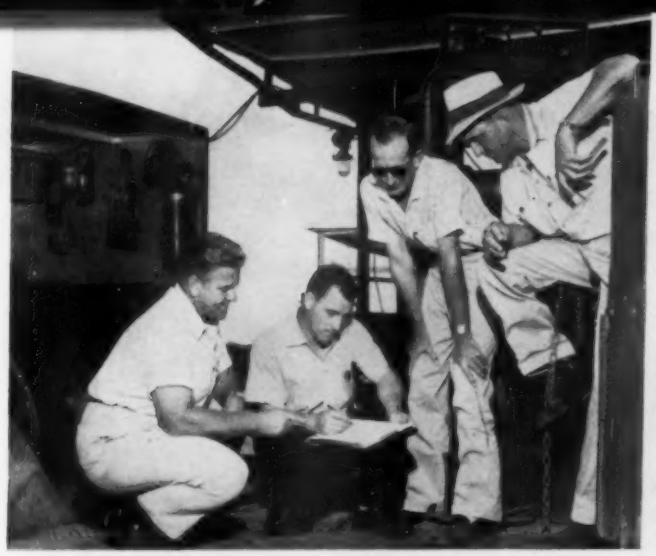
In many areas the logging companies hold schools for log interpretation. Today oil companies are leaning very heavily on electric-log interpretation. For this reason, the log companies try to educate oil operators, particularly the independents, on how to best use their product. These logging schools are one approach. The logging company will give a 5-day course on electric-log interpretation and provide expert instructors. It is not all theory because the students who are competent engineers, geologists, and oil operators, work with actual examples based on wells in the immediate area. Each local area has its problems in log interpretation, and these are pointed out during the logging-school sessions. Schools on electric-log interpretation are growing in popularity, and they are always well attended. For example, a recent 4-day logging school held in Tulsa was attended by 260 people from places as far away as Denver and Midland.

In addition to providing interpretation, the logging companies will advise operators on how to set up their well-logging programs. This advice is particularly valuable to a new operator in a field. He may be working in West Texas where the section is predominantly limestone. He is entirely unfamiliar with the type of electric log run in Central Oklahoma, for instance. Or he may be entering the Rocky Mountains where fresh water makes log interpretation difficult in many of the potential pay zones. The logging companies are eager to help orient this man on the problems of the area and to provide him with their many years of log interpretation.

Competition is keen among these companies that provide the oil producers with workover units, trucking, cementing, acidizing, fracturing, electric and radioactivity logging, perforating, and many other types of specialized services.

The companies' main aim is to provide the right tools to do the job at a specific location. Since oil is produced over a wide area, conditions also vary. It is therefore impossible to use a certain type of tool universally. Service companies must design and build tools that give most data at a reasonable cost, and be applicable in a given area. This necessitates many varied tools to serve the entire industry.

The ability to interpret logs, both electric and radioactivity, is a combination of basic logging theory, good tools, and a thorough knowledge of an area. This provides the major com-



A mud company's service engineer discussing mud conditions with an oil company superintendent and geologist and drilling company tool pusher.

Long-range research by service companies benefits both the company and the customer. Here a research engineer checks technique under bottom-hole conditions.

PRODUCTION

# companies serve

## —and a valuable, trusty ally to big and little

BY NORMAN S. MORRISEY
Drilling-Development Editor

pany additional experts to consult with their engineers and geologists and to combine their knowledge.

To the small independent operator, a service company provides a type of consultant, cost free, to aid him in his well-completion problems. In this respect, the service companies make it easier for the small independent to be as effective in his exploration program as a major with its large staff.

**Perforating companies . . .** The industry is also provided with a large number of perforating experts through the service company. As an example of the vast experience of these experts, it might be well to note that an engineer even with a large major company, would only see or participate in the perforating of about 2 wells a month or 24 a year. The service-company engineer would actually be on 200 to 400 jobs a year. This vast experience in a given area gives the service-company engineer an opportunity to evaluate the results of all types of perforating and pass this experience on to his customers to aid them in their selection of methods and tools.

When a well is to be set up for through-tubing perforating work, this experience is vital. This is a very specialized method and the success of the job not only depends on the type of perforating gun used, but on such things as fluid in the hole, packers, seating nipples, etc. Any of these factors could jeopardize the perforating job if not properly handled. Again, experience is the best guide and the service-company engineer is present to offer suggestions based on past performance.

There are also many other highly specialized services available such as dip and drift logging, perforating for fracturing, perforating for large hole and deep penetration, cavity logging, and many others. In these jobs the experience of the engineer is the only thing an oil company has as background for choosing and successfully applying these services to his wells.

To provide the industry with the

Service companies run field tests to determine the optimum completion technique. Here a service engineer is testing the operator's oil to see how it will react to a special type acid.

Today log interpretation is a specialized science. And service companies conduct special schools to teach engineers, geologists, and operators how to get the most information from a log.

Lengthy and rigid field tests follow closely on the heels of successful laboratory experiments on new service company products. This insures topnotch performance on any new product marketed.

newest and best of these services, one perforating company has two large research laboratories. This firm carries on extensive programs at its installations and also cooperates with outside research concerns to provide the industry with the newest and best jet perforating methods.

Here is what the service companies strive for:

1. To provide the oil companies, both large and small, a pool of experts for consultation.

2. To give the small independent a large engineering and research department to aid him in solving his well problem.

3. To give the industry new tools, made possible by research and speeded to use by the keen competition among these service companies.

These services are provided to the industry with no price tag and backed up by the vast research and engineering facilities available to them. These services aid the producer in his problems and help to make the service company more effective.

### Cementing

Many of the "extras" that service companies provide oil operators—particularly the smaller operators—are technical in nature. Here is how one large cementing company helped its client:

During 1957 a small operator in southern Oklahoma decided that a stripper-well field he operated would benefit from a water-flood program.

For a major oil company, a water-flood program is relatively simple; technical personnel, research facilities, and past experience are available. Orders are issued, buttons are pressed, engineers and chemists begin work.

Lacking all this, the Oklahoma independent turned to its cementing company. The service company was able to assist the oil man and his geologist by providing one of its reservoir engineers and making its laboratory and computing facilities available. The water flood is now in operation and producing more oil.

Particularly for the smaller operator, sand control in wells is a tough problem. One cementing company has field laboratories with competent engineers who have encountered the same problem before. These experts can usually suggest solutions within hours. More detailed studies are made at the company's technical center.

**South Louisiana . . .** One of the first steps taken by a consulting geologist at New Orleans when he begins a well in an area unfamiliar to him is to confer with the cementing company's men stationed in the area. They are familiar with general drilling practices and such details as amount of surface pipe usually set. As a result, the service-company personnel can often save time and money for the geologist and his client.

**Williston research . . .** All producers in the Williston basin are benefiting from a successful joint research study conducted by service companies and several oil companies. The problem was preventing plastic flow of salt strata that was collapsing pipe. When the problem was licked, the solution was made available to all the area operators.

The increasing use of air drilling and the resulting techical problems prompted cementing companies to begin their own research program in this field. As new techniques are developed and perfected, they are made available to the industry.

Perhaps the single most important "extra" use that producers make of one service company's field laboratories and its home-office technical center is core analysis. Cores from domestic and foreign fields are studied daily, in order to make production-improvement recommendations for primary and secondary recovery.

**Good Samaritan . . .** Nontechnical "extras" are important, too. As the operator of the world's largest privately owned short-wave network, Halliburton Oil Well Cementing Co. finds that the help radio can give during emergencies is priceless.

The most recent example of how useful radio can be on a large scale was provided by Hurricane Audrey when it struck coastal Louisiana. Halliburton—plus other supply and service companies and the oil producers—made its shortwave network available to restore communications, direct rescue teams, and generally be of help.

Roving Halliburton cars equipped with two-way radio were active both during the hurricane and during mopping-up operations.

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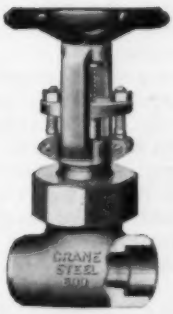


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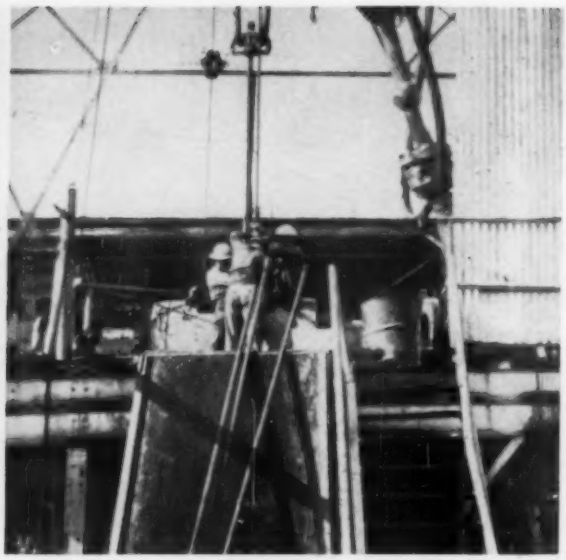
Logging and perforating companies work around the clock to provide the operator service that he needs. Their experts are always available to help solve the operator's problems.



New completion methods require both laboratory research and field experimentation. Here a crew is running tubing in a southern Oklahoma field where better completion techniques made a pay zone economic.

The most valuable contribution that service companies can make to the oil companies lies in the field of specialized knowledge and techniques. Continuous research and development programs and day-by-day service experience with its customers foster the advanced new services and product knowledge of tomorrow.

**Water analysis . . .** In an area where production might be found in several formations, an operator set pipe through the Mississippian but perforated only a section of the Pennsylvanian.

After acid treatment, the well made a large volume of water. Tests in a service company's laboratory established the water to be of Mississippian origin, indicating communication behind the casing. The operator perforated a short interval at the base of the Pennsylvanian and squeezed it to shut off the water.

**Core sample tests . . .** Service companies are always on the alert to help their customers. Core samples are analyzed to determine the best treatment to increase production. This may be one or a combination of services; i.e., acidizing, fracturing, perforating, etc.

**Oil-sample tests . . .** Service companies' field engineers test well fluids before the well is treated to determine the compatibility of these fluids with various treating solutions. For example, when lease oil or "frac oil" is used in the treatment, the fluid loss characteristics of the oil may also be determined. Information gained by such tests enables the engineer to recommend a treating solution that will prevent the formation of pore plugging emulsions or end products and at the same time will provide a maximum increase in production.

**Testing cements for future needs . . .** To anticipate future needs of the industry, cementing companies are always doing research work, such as designing cement slurries that can be used at 30,000-ft. depths, higher temperatures, etc. BJ Service, for just one example, is constantly testing cements and cement mixes; and BJ provides a consulting service to formulate complete programs for cementing services and well stimulation.

Here are some of the research projects now under way by one service company:

1. **Subsurface measurements.** More accurate subsurface measurements through radioactivity logging to pinpoint the most prolific zones.
2. **Perforating.** More powerful, more effective bullet and jet perforating.
3. **Surveys.** Temperatures, caliper, and fluid-flow surveys.

**Special-treatment techniques and materials . . .** Another service company develops special treatments for wells where conventional treatments cannot be used or have not proved effective.

It pioneered a new oil-cement slurry that provides the oil industry with the most effective method yet devised to eliminate water from a producing oil or gas well.

A high-yield slurry cement mix was developed to permit cementing longer strings of casing in one stage without the use of stage collars, and at the same time to reduce pressure on formation.

Special sand-packing techniques have been developed that consolidate the producing sands, increasing the productive life of the well.

**Case history . . .** An operator was completing his first well in North Texas in the Caddo formation. Prior to this he had drilled in an area where large volumes of acid were required to attain commercial production. He planned to treat his Caddo well with 5,000 gal. of acid.

A service company's long experience in the area indicated that the optimum Caddo treatment required no more acid than necessary to overcome what has been termed the "skin effect" or localized plugging which results from drilling operations. Large-volume treatments usually "let in the ocean."

After explaining these conditions to the operator, the service company engineer recommended a treatment of 250 gal. of acid. This recommedation was followed, with the result that the well made only a small amount of water and a commercial quantity of oil. After a 5,000-gal treatment, there probably would have been no oil. And the operator saved 4,750 gal. of acid. The result? A satisfied customer and a commercial oil well.

For a free full color print of the above illustration, suitable for framing, send your request to the Oil Center Tool Company, P. O. Box 3091, Houston, Texas

## South Texas Panorama... Beef, Bales, and Barrels

South Texas is a country, not an area.

Farms, ranches and orchards have long been dominant in the economy of South Texas. But in the last decade, these have been augmented by new industry. And sprinkled between the cotton, grapefruit, plants and cattle are monuments of another strength . . . derricks and Christmas Trees.

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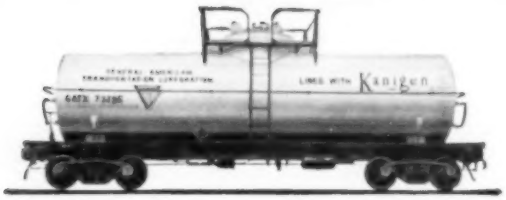


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REFINING

# Better lubrication at lower cost

## . . . Phillips has been gradually reducing the amount of oil used in engine lubrication: result, a corresponding reduction in upkeep costs

BY J. E. MALLOW

OVERLUBRICATION is costly. Just as costly as underlubrication. When Phillips Petroleum Co. decided to do something about it in its installations, a goal was set. It was to reach 8,000 b.hp.-hr. per gal.

This goal has not been reached in all of Phillips' installations. But in the majority of the installations Phillips is approaching this goal; and in a number of instances this goal has been exceeded.

There has been a corresponding reduction in maintenance costs.

Someone has stated that "friction, like taxes, will always be with us." We, as ordinary individuals, do not have an opportunity to exercise very much control over taxes, but we have been able to reduce friction through the use of the correct amount of proper lubricants.

We would like to emphasize those two words, "correct amount," since either too little or too much lubrication can be detrimental to mechanical equipment. In general, we believe it has been the practice to overlubricate.

We, as operators, should be in a good position to determine the correct amount of lubrication required, provided, of course, that we know our business. Possibly one reason for overlubrication has been the opinion as expressed by some that "oil is cheaper than cast iron," and again, if a small amount was good, then a larger amount was even better. Oil, of course, is cheaper than cast iron, but if improperly applied, it can cost us cast iron as we will point out later in this discussion.

### Engine Lubrication

Consider the lubrication of our large engines which we are operating in most of our ptants. In quite a number of instances we are still going along with the same oil rates as existed 20 or 30 years ago. In fact, far too many hold to the opinion that "I have used that amount of oil for 20 years, and I see no reason why it should be changed." There still exists that fear of possible underlubrication and resultant wear. We do not take into consideration the fact that, like the automotive engine, our large engines have had vast improvements in design and material construction.

Author is with Phillips Petroleum Co. at Bartlesville, Okla. Revised paper presented at Oklahoma City meeting of NGAA, January 31, 1958.

**New materials . . .** In practically all cases today the cast iron used in cylinders and pistons is a process iron with a higher Brinell hardness. There is less possibility of cylinders and pistons galling since the process iron contains less free ferrite. Water jackets are designed so that the water is directed to all parts of the cylinder, eliminating the dead spots which formerly existed. The tendency for the cylinders to elongate and become out of round as a result of operating temperatures is therefore reduced. Finish on cylinder bores and pistons has been improved and in addition we have oil-cooled pistons.

In the past, too, it was uncommon to find piston rings 1 in. wide or wider. Irregularities on the face of the ring or cylinder bore prevented full contact of the ring on the cylinder wall. Firing pressure behind the wide rings, however, imposed extreme pressure at points where there was only a small area of the ring in contract with the cylinder wall. In most instances today we use narrow rings which reduce blowby.

Light testing of rings at the factory has, in general, become a common practice which insures us a perfectly round ring to fit the cylinder. Ring design and materials have also been improved considerably so that we can now secure rings to handle most any situation we encounter. Faces of rings are also coated with materials which hold lubrication and carry the rings and cylinders through critical periods.

Neither should we overlook the vast improvements which have been made in the quality of our lubricating oils. In spite of all of these improvements, however, which are available to us today, we are still inclined to be cautious and, therefore, use more oil than is required.

### Overlubrication Is Costly

We fail to realize that overlubrication can often be as costly or even more so than underlubrication. Why do we have stuck piston rings, carboned ports, fouled spark plugs, burned exhaust and intake valves? The answer, of course, is overlubrication.

The damage, however, is not confined to the items listed above. When the rings stick, the fire from the ignition of the fuel charge passes by the face of the rings and burns the lubrication from the cylinder walls. We then experienced a condition of underlubrication due to overlubrication and either excessive cylinder wear, galling, or even cracked cylinders and pistons. Since the rings in this condition cannot perform their function of sealing firing pressures, the power cylinder is prevented from carrying its proportionate share of the load imposed on the engine. The additional load must then be picked up and handled by other power cylinders of the engine provided, of course, that they are not in the same condition.

The added load to these cylinders requires they operate at higher firing pressures and temperatures. The in-

creased pressures and temperatures in time cause detonation, creating pressures in excess of that which the bearings are designed to carry. If this condition is permitted to exist any length of time, we, of course, will have bearing failures. This is true in spite of the improvements which have been made in bearings such as precision seats and shells, reduction in babbitt thickness, and more satisfactory bonding methods.

**In two-cycle engines** we find overlubrication resulting in a buildup of carbon in the exhaust and intake ports. In either case, due to restriction, we are unable to secure thorough scavenging of the power cylinder. The restriction in the ports along with the exhaust gases remaining in the cylinder prevents us from receiving a full charge of fresh air and our fuel-air ratio is then unbalanced. The cylinder still receives the same amount of fuel gas with the result we have a mixture which is too rich, creating more heat but less power and once more we are faced with a weak cylinder which will not carry its share of the load.

**On four-cycle engines,** in addition to stuck piston rings, carbon formation restricts valve ports and contributes to sluggish operation of valves which again provides us with a weak cylinder.

The detrimental effects of overlubrication, however, are not confined to the power end of the engine. We find excessive carbon formation in the ports of compressor valves restricting the flow of gas and often contributing to an early failure of either the valve seat, valve springs, or disk. We also experience compressor rod packing failures due to overlubrication.

**No lubrication here . . .** There is one other very important part of the engine where actually there should not be any lubrication whatsoever, yet quite often we seem to be doing our best to see that it has ample lubrication. We refer to the block on which the engine is set. Oil allowed to leak on the block soon finds its way underneath the main frame and in a short while we experience movement of the engine. We immediately start tightening the anchor-bolt nuts, but by applying normal torque we find we do not stop the movement. In an attempt to hold the engine firm, the anchor-bolt nuts are tightened even tighter until the anchor bolts are broken. Finally, we are forced into a costly job of replacing the anchor bolts and resetting the engine.

An oil leak should be promptly corrected, not only because of the possible damage but also as a matter of safety and good housekeeping. Quite often, however, we find the personnel taking the attitude that it is impossible to eliminate all of the leaks. Yet, in another installation we find personnel who with diligence have mastered the situation with either the same type of engines or of even older design on which it is sometimes more difficult to control oil leakage. Actually, then, our problem is not oil leaks but instead personnel who, because of a lack of concern, permit them to exist.

### Reduce Lubrication

For years we have contended that lubrication should be reduced to the minimum necessary to maintain an oil film on the cylinder wall and any in excess of the required minimum only resulted in increased maintenance. In recent years, through the cooperation of our district and plant personnel, we have been making a concerted effort to reduce our oil consumption.

We had been averaging around 3,000 b.hp.-hr. per gallon of oil used. We set 8,000 b.hp.-hr. per gallon as a goal we desired to attain. This was to be based on all the oil used in the power and compressor cylinders as well as that added to the crankcase. We believed that the crankcase changes should not be included. We did not immediately cut our oil feed rates to the 8,000-b.hp. figure. Instead, the amount of oil fed to the cylinders was cut in steps and a week to 10 days after each adjustment a cylinder head was pulled to determine if the cylinder walls were operating dry or if lubrication could be further reduced. A small piece of absorbent paper placed on the cylinder wall was used to determine the amount of lubrication remaining on the cylinder wall. We have not reached our goal in all of our installations, but in a majority we are approaching it and a number we have exceeded it.

**Reduced maintenance . . .** We are also seeing the results in reduced maintenance costs. Previous to the reduction in oil consumption in an installation where we have seven 600-hp. two-cycle engines, we found it necessary to replace 78 power piston rings in the overhaul of the seven engines. In this same installation we are now averaging 10,000 b.hp.-hr. per gallon and in an overhaul of the same engines it was only necessary to replace 11 rings, or fewer than two rings per engine. Micrometer measurements of the cylinders indicated no more than normal wear.

We would not want to leave the impression that we expect a like percentage of reduction in ring replacements on all of our installations. There are, of course, other items which can affect ring life besides overlubrication.

In other installations of large four-cycle engines we have averaged in excess of 25,000 b.hp.-hr. per gallon for several years. As in the case of the automative engine, the human element did not enter into the amount of oil consumed except in design, selection, and assembly of component parts. These engines used only the amount of oil that was permitted to pass by the oil-control rings, and we can be quite sure that this amount was in excess of what was actually required.

If the amount used, however, had been what operating personnel had considered was required, our brake horsepower-hours per gallon would probably have been considerably less than half of the 25,000 b.hp-hr. per gallon that has been attained. Our oil costs per brake horsepower are now 50 per cent less than in previous years. This savings along with a reduction in ring replacements, while not a small amount, will only be a fraction of our future savings due to a reduction in lubrication. We anticipate we will be able at least to double the length of periods between overhauls and thereby reduce the labor cost by one-half.

In addition, we are of the opinion we will reduce the amount of cylinder reboring and piston replacements which are surely not minor items of cost. As pointed out previously, we are also of the opinion we will reduce the amount of bearing replacements. In reducing our down time for maintenance we will likewise keep our engines on the line a greater percentage of the time and as a result be able to handle larger volumes of gas over a given period of time.

The question now arises as to just how far we can go in the reduction of our lubrication. Frankly, we as yet do not have the answer. It is quite probable that some hearing this discussion have already exceeded the totals which we have reached. We have come to the conclusion that the possible benefits are so great that we could even afford to damage a few cylinders through underlubrication in order to find the minimum point of lubrication. We actually consider the reduction in lubrication as a very important phase of our preventive maintenance program. If we can prevent the damage as a result of overlubrication, then, of course, we are preventing future maintenance.

# Problem at the plant? These tips may solve it

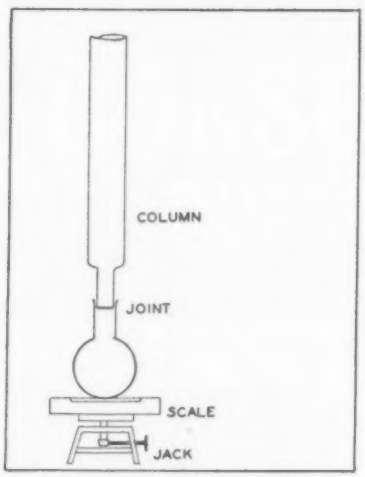
## Platform scale . . .

BETTER ANALYSES and less glass breakage are direct results of using a platform-type scale when running laboratory distillations.

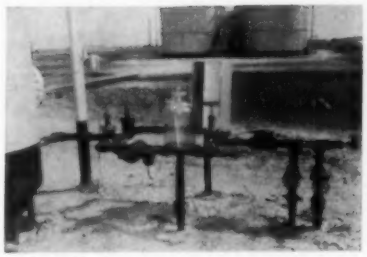
The scale (platform, bathroom type, or similar) is placed on a jack and used to support the still pot. When the column is set in place and secured the tension on the joints can be quickly determined. By making the necessary adjustments, the desired pressure can be maintained on the column. The scale provides not only an indication but a positive application of pressure without rigidity.

Without the use of the scale it is very difficult to obtain the proper seal between the still pot and distillation column due to the high temperatures at this point. If this seal is not tight, leaks will occur. If there is too much tension, the glass may break from thermal expansion or strain.

Use of the scales has proved very satisfactory. The positive pressure has reduced leaks and resulted in better material balances. The lack of rigidity has improved the service factor for the glass units. With less glass breakage, there is an attendant savings in sample costs which can run quite high when they are especially made on pilot plant units.




Method suggested by C. C. Parish, lab assistant. Courtesy Humble Oil & Refining Co., Baytown, Tex.



## Sample measure . . .

IN the Hastings oil field of Brazoria County, Texas, Pan American Petroleum Corp. uses this simple hookup to measure and sample the production from their test separator.

It consists simply of a meter and sampler put into a bypass on the crude outlet of the separator. The dump valve which is controlled by the height of the liquid in the separator is on the right.

When the well is on test, the production is turned through the meter and a sample is kicked out into the jar in every ¼ bbl. of liquid produced.

The percentage of water in the jar can then be deducted from the meter reading to get the crude production.

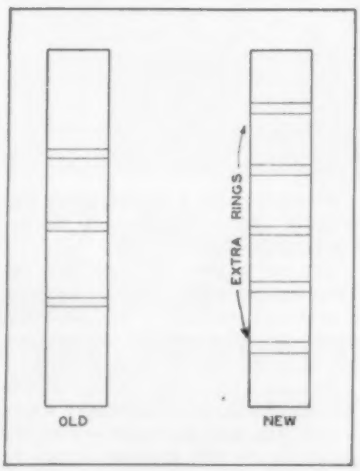
If the crude is emulsified, the sample is shaken out and that percentage used to determine the amount of crude going through the meter.

## Extra rings for fluid pistons . . .

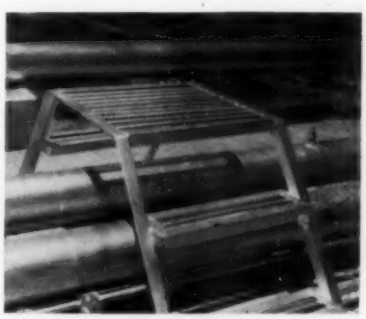
CAST-IRON fluid pistons on deethanizer-tower feed pumps were subject to excessive ring wear. The heavy weight of the pistons caused excessive wear of the rings, requiring their being replaced about every 2 months.

The pistons used were equipped with three rings. It was decided to machine two extra ring grooves on each piston. These additional grooves were added, one on each end of the piston. In this manner, the weight of the piston was equalized over a larger area as well as over a greater number of rings—five with the modification.

The useful life of the pistons has been extended by this change. Replacement of the rings is now only necessary about every 8 months, thereby reducing downtime by a substantial amount.




Method suggested by Robert H. Westerfield, repairman, Tom O'Connor gas plant; courtesy Humble Oil & Refining Co.



## Small walkway . . .

STEEL reinforcing rods were used in the construction of a small walkway across some pipe runs at Goliad Corp.'s Wilcox plant.

The rods were used as crossmembers and spaced to provide an ample walking area. Angle irons welded together make up the main frame of the walkway.

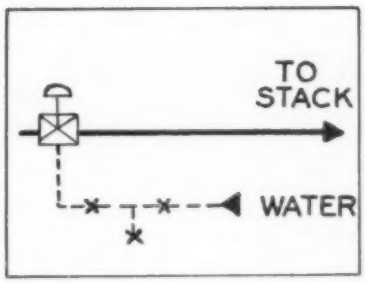
The many raised surfaces on the rods themselves serve to provide nonskid footing.

## Flue-gas control valve . . .

THE FLUE-GAS control valve on a pilot-fluid catalytic-cracking unit was subject to plugging during regeneration of the catalyst.

The usual practice was to wash the valve out with water or steam every few hours or so. This was naturally time consuming and interfered with the experimental runs.

A hole was drilled in the bottom plate of the control valve and a water injection line installed. Water can be introduced through this port to keep the internal valve surfaces clean. This has improved the operation of the unit and has eliminated the need to periodically shut down specifically to clean the valve.




Method suggested by Ernest R. Sutphin, pilot plant operator, Baytown, Tex.; courtesy Humble Oil & Refining Co.

## Line sweating . . .

SWEATING of lines, valves, and vessels in low-temperature service can be eliminated by coating the exterior surfaces with an insulating spray-type coating.

Goliad Corp. uses a Dimetco spray protective covering which is simply sprayed on to the desired thickness. Once dry, it is painted according to the plant color scheme.

The relatively thin insulating layer is sufficient to prevent condensation upon the exterior surfaces. Sweating and the accompanying rust stains are thereby eliminated.

## Gas-lift control . . .

L. E. MOORHEAD, switcher for Texas Gulf Producing Co., controls all his gas lift wells from a header in front of the compressor plant on the Fitzgerald lease in Barbers Hill field of Liberty County, Texas.

Four joints of 8-in. pipe are welded together in front of the station, acting both as a header and storage compartment for the gas to line out the surges.

A connection for each well on gas lift is set on top of the header with a connection leading off to the left to the casing heads of the wells and the pop valve and vent lines coming off on the right.

Another regulator not shown feeds excess gas back into the suction of the compressor. This arrangement saves the switcher many steps where the wells are in inaccessible places.

## Tank heaters . . .

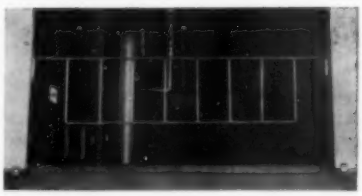
KILMARNOCK Oil Co. uses this old separator on wheels to heat the tank bottoms on batteries that do not have heaters in the Orangefield salt dome of Orange County, Texas.

They took an old 2½ by 10-ft. separator, steamed it out, and inserted a firebox in one end with fire tubes running the length of the vessel and then set it on a tandem four-wheel trailer.

Along the side a duplex pump was installed and connected up to the gas line for power.

The gas is also connected into the side of the vessel to liven up the tank bottoms as they are circulated. A thermostat controls the temperature of the outlet line.

This rig can be set up in a matter of moments at any tank battery where a tank has been turned down by the gager due to high bottoms or can be used to melt paraffin out of flow lines or provide heat for hot-oil circulation in the producing wells.



## Guard rail . . .

THIS GUARD RAIL is a safety feature in a compressor building in an East Texas gasoline plant.

It rests in two receptacles made from pipe nipples welded to the steel building frame.

The guard can be easily removed simply by lifting upward. In place, it prevents personnel from inadvertently stepping off the edge of the building floor, which is several feet above ground level.

# STOP EVAPORATION LOSSES

# CONSERVE QUALITY

# INSTAL

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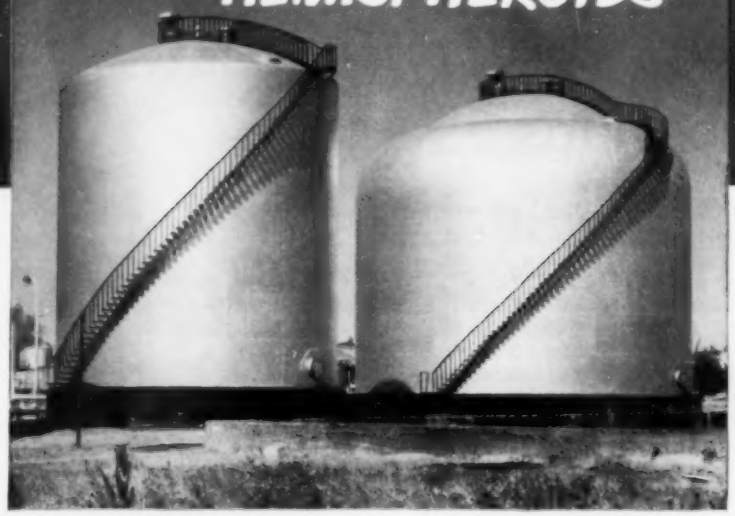

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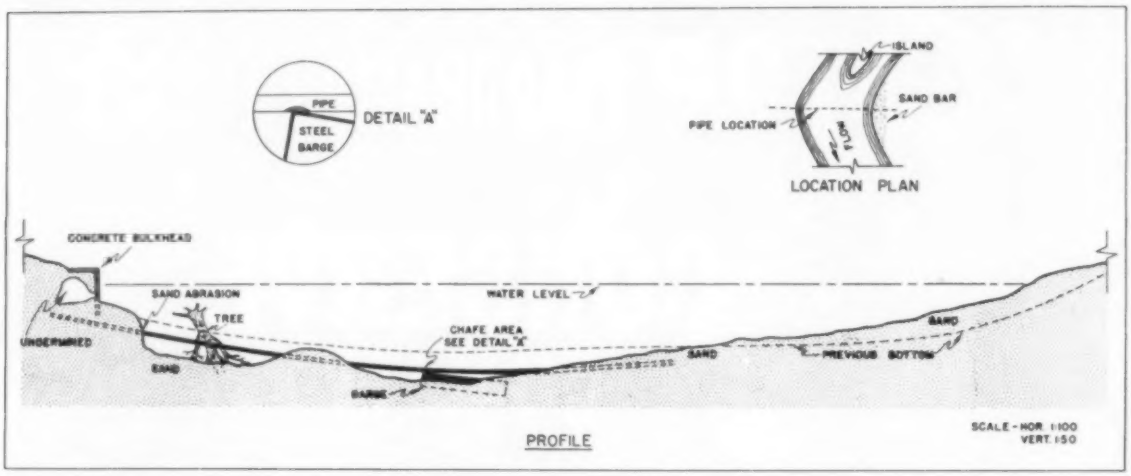
Fig. 1




**When underwater enemies attack river crossings ↑ gird for battle like this ↓**

# Divers find, help repair damaged crossings

PIPELINE river crossings require periodic maintenance. Major river crossings are the weakest link in a transmission line. Exposed pipe and suspended spans are subjected to lateral forces, sand abrasion, stress corrosion, fatique where bending or vibration occurs, and chafing by debris.

Many major companies have an annual survey on each of their major crossings. Immediately after the survey, maintenance repairs are made to correct broken coating, exposed pipe, and suspended spans.

### Procedure

The ideal maintenance procedure on river crossings is to start with an "as-built" drawing showing the accurate elevation and horizontal position of the pipe. This information should be obtained by a diver and survey crew immediately after installation of the pipe and before backfill. Permanent bench marks for this survey should be placed over the pipe near the water's edge and these referenced to a stable bench. These

**DIVER** prepares to locate exposed pipe and inspect for defects.

**BY C. F. LOGAN**
Logan Diving & Salvage Co.

**THE AUTHOR**

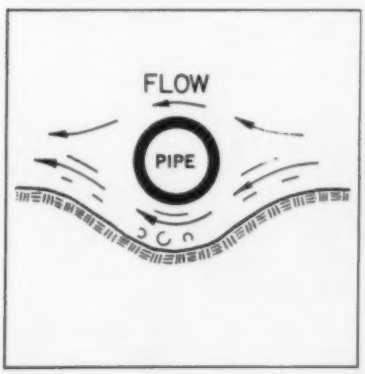
C. F. Logan is an engineer who is actively engaged in marine survey and construction work specializing in submarine pipeline installation, maintenance, survey, consultation, and repair work. He is a member of the firm of Logan Diving & Salvage Co., Jacksonville, Fla., and as such has done underwater work for such companies as Panhandle Eastern Pipe Line Co., Southeastern Pipe Line Co., Creole Petroleum Corp., and Algonquin Gas Transmission Co. Logan operations extend throughout the U. S., Caribbean, and South America.

marks will give an immediate, visual warning as to whether the stream bank is eroding.

The approximate horizontal position of the pipe under water is checked with an induced tone locator. The approximate vertical position of the stream bed is checked with a fathometer. The diver locates all the pipe exposed above the stream bed.

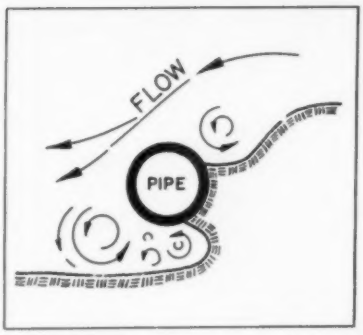
The diver may use an electromagnetic locating device to aid him in finding the pipe.

A survey crew ties in the horizontal location, the vertical location, and the diver's position at all times. At the locations of exposed pipe the diver holds the lead line on the pipe for an exact vertical reading; he also notes the extent of suspended spans, broken coatings, damaged pipe, debris on the pipe, sand abrasion, stress corrosion at points of suspension, and type of stream-bed materials. The diver must be experienced enough with this type of survey to perform his operations by feel since there is seldom any visibility in a major river.




**STREAM FLOW** showing turbulence around an undermined pipe. Fig. 2.

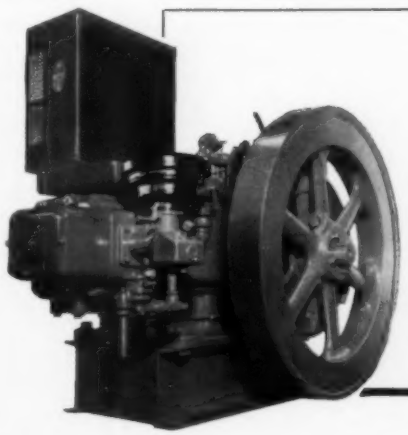
The underwater inspection crew will formulate a report which will include a plan drawing showing the location of the pipe and characteristics of the stream flow. A profile drawing will show the type of stream-bed material, the vertical location of the ground line, and all exposed pipe tied in with a bench mark on shore. These drawings must be accurate so that all changes either in the stream bed or defects in the pipe each year may be shown as revisions on the original maintenance drawings. Permanent samples of stream-bed materials may be included where unusual materials are found.




**STREAM FLOW** showing turbulence around a partially undermined pipe. Fig. 3.


# See Witte's New 28hp

**4-cycle natural gas-gasoline power unit**



## F-28

**The F-28** is rated 28 horsepower for continuous operation. This engine is completely weatherproof and can be operated the year 'round without protective housing.

**WITTE's new F-28** incorporates the newest engineering concepts developed for its line of oil field pumping engines. •Conventional enclosed-type clutch •Extremely smooth running •Can be mounted on structural steel pumping-unit base extensions •Piston has three compression rings and two oil rings •Split hub flywheel •Counterbalanced crankshaft •A wider and more flexible speed range.

These features help the new F-28 do the same pumping job that other Witte engines do so well:

1. Replaceable wet-sleeve cylinder liner.
2. Replaceable valve guides and valve seats.
3. Connecting rod has an aluminum alloy crankpin bearing.
4. Condenser-cooling system.
5. Tapered roller main bearings.
6. Ignition system has a rotary-type magneto with impulse coupling.
7. Combination pressure-feed and splash-flood lubrication system.

*USS and Witte are registered trademarks*

*Complete information on the NEW F-28 is available through oil field supply stores*

*gas-gasoline models from 3¾ to 42 hp  full diesel models from 3¾ to 18 hp*

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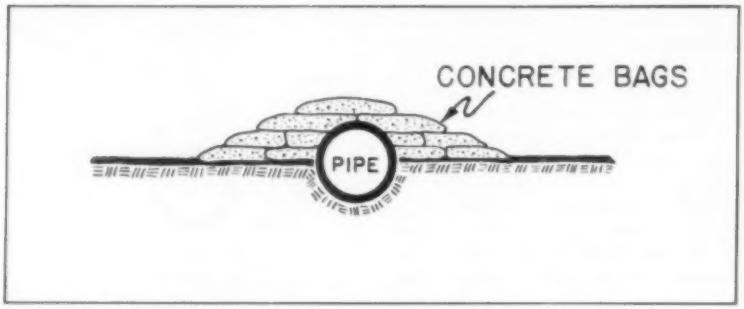
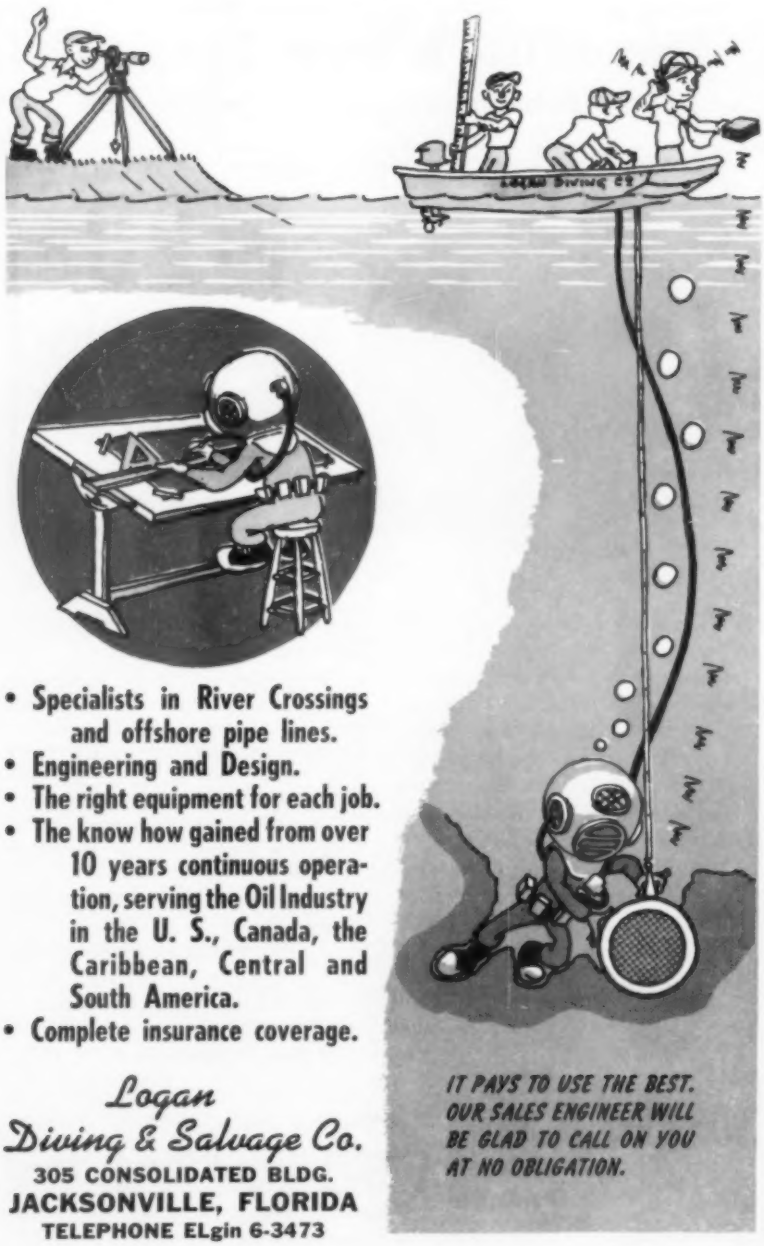



**EXPOSED PIPE** repaired by covering with concrete-filled bags to prevent sand abrasion, cover broken coatings, and prevent further undermining. Fig. 4.



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Recommendations, cost estimates, and detail drawings for the correction of all defects should be included in the report.

### Suspended Spans

Suspended spans generally occur near a short line. If there is a curve in the river, the outside of the curve is the most likely location for a suspended span because centrifugal force sends most of the water to the outside of the curve (see Fig. 1). If the pipe crosses at a narrow place in the river, then a higher velocity current exists and the suspended span is subjected to greater and more damaging forces than at a wide spot.

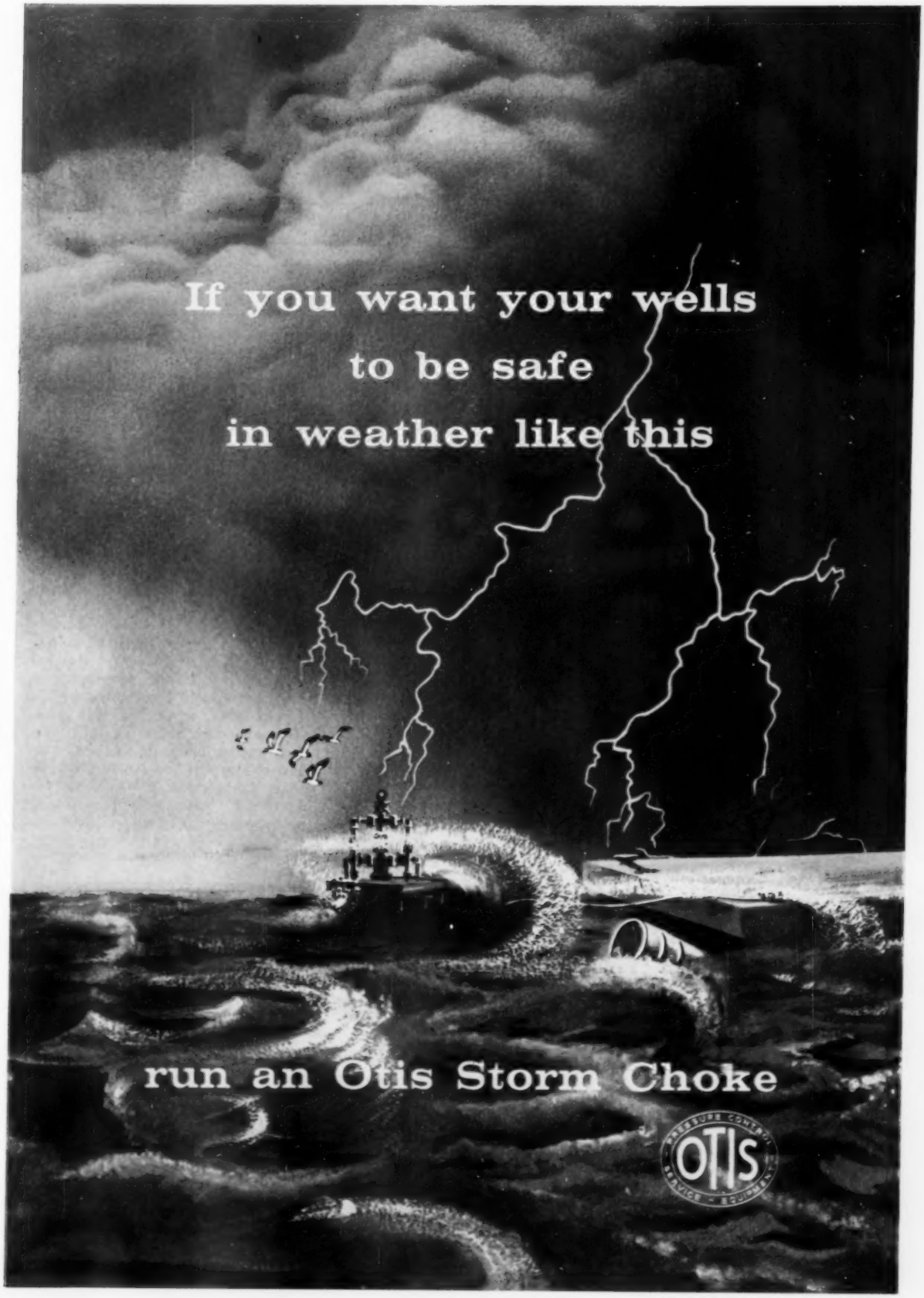
The main channel of a stream may shift. The cause of stream-bed shifting may be a tree or group of trees lodging on one side or the other of the stream creating an eddy current where sand may deposit. The shifting of a stream bed may bring about a suspended span in a pipeline during a single short period of high water. Once a pipe becomes exposed, the flow of water under the pipe tends to accelerate the scouring action, increase the turbulence, and increase the length of suspended pipe (see Figs. 2 and 3).

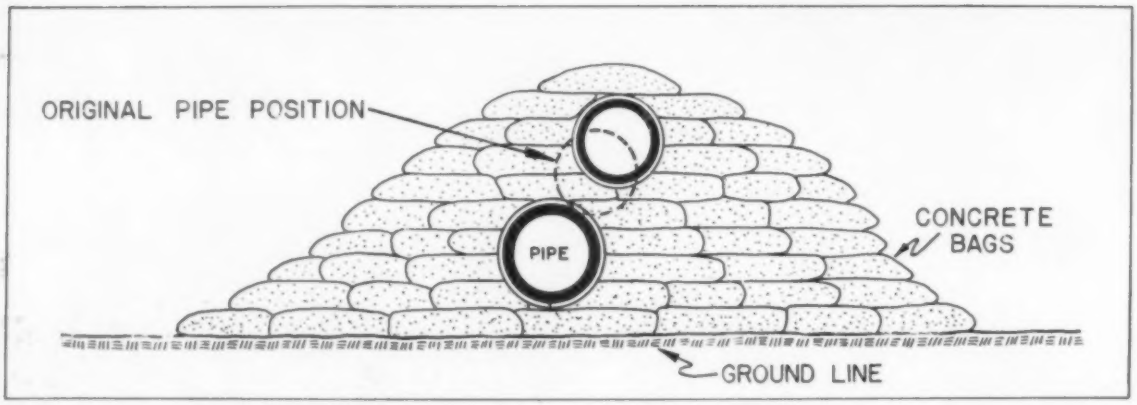
Stress areas occur at the points of suspension. The strain from the weight of the suspended section is at its maximum at these points. Stress reversal may also occur here due to swinging motion caused by the current which is sometimes amplified by hanging trees. Fatigue may so lessen the strength of pipe that failure will result. Further, the turbulence resulting from scour under the pipe may cause failure from sand abrasion; and stress corrosion may set in where sand abrasion occurs. Cathodic current is no protection in these cases.

### Sand Abrasion

Sand abrasion generally occurs in streams where swift currents exist for long periods of time. These swift currents may be actuated by tide or by floodwaters. The sand-abrasion areas are generally found at the point of suspension or at the edge of an exposed river weight. Rare-earth sands including rutile, zircon, ilmenite, and monozite may further aggravate sand abrasion. (Several companies have had the experience of laying through iron-ore-bearing strata.)

The diver must take samples of the stream bed where the pipe is exposed for correct analysis and correction of the difficulty. The high-density sands are generally most abrasive; also they may stratify into layers. The approximate density of the sample can be easily checked in the field by drop-


If you want your wells
to be safe
in weather like this
run an Otis Storm Choke
OTIS




**REPAIRS** to two undermined pipelines in contact with each other are made by separating the two lines, placing a plastic jacket around each line, and placing dry-mix concrete-filled bags under and over the two pipes. Fig. 5.

ping a few grains into a tube of acetylene-tetrabromide (specific gravity 2.94).

Several locations have been found where sand abrasion existed but leaks were prevented by covering the pipe with concrete-filled bags (see Fig. 4).

It is the opinion of the writer that many leaks classified as corrosion leaks actually were caused by sand abrasion.

### Debris on a Pipe

Trees coming down a river during a flood may readily hook on to a suspended span, especially when the limbs are pointing downstream. The trees may vibrate in the current and chafe off the coating; or the movement of the trees may cause constant movement in the suspended pipe which in turn brings about fatigue. A tree with the limbs pointing downstream may hook under the suspended pipe at the correct angle to give terrific leverage upward tending to raise the pipe out of the ground especially where several trees may later become hooked on the first tree.

A pipe may come in contact with another pipe, a submarine cable, a sunken steel barge, or other metal bodies. If the contact occurs above the ground line, then the diver can readily determine the type of contact and the amount of damage that is being done by this contact and make the recommendations for correcting the defect.

This condition has been noted in many instances in Lake Maracaibo where new pipes may be laid across old pipes, cables, and sunken objects. The most common correction for the defect is to jack the pipe away from the object and place a split plastic jacket around the pipe, or cable, and place dry-mix-concrete-filled bags between the pipe and the metal object (see Fig. 5).

In still bodies of water where very little current exists a pipeline exposed above the stream bed may pass through several strata of different waters. The differential density may be caused by such factors as sewage, acid-bearing mill waste, salinity content, and temperature. The diver many times can easily see the strata as he passes through them.

This condition is especially noticeable in tidal areas where several feet of fresh water containing dark-brown tannic acid from decayed vegetable matter floats on clear salt water. The pipeline passing through these various densities and various temperatures creates a battery action that may result in corrosion.

### Corrosion

That part of a river crossing that is buried and continually submerged in sedimentary materials and does not contact foreign metallic objects or acid mill waste, in general, does not suffer corrosion. Corrosion generally occurs at points where it is alternately wet and dry, exposed above the stream bed, passes through rock formations, or touches a foreign metallic body. Corrosion occurs then only when the coating is defective or broken. Cathodic protection may be applied to take care of these specific cases of corrosion.

### Corrections

A suspended span or exposed pipe underwater may generally be corrected most economically with dry, bagged concrete (1:4) mix. The bags stabilize the pipe, prevent water from flowing underneath the pipe so it will tend to silt in, and serve to help inhibit corrosion at the coating breaks.

In some cases it may be necessary to lower a line due to major changes in the river course brought about by a flood. However, the bag process of correction is preferred wherever practical because new stresses are set up in lowering the pipe and the coating may be damaged and stream bank softened by reexcavation.

### Budgeting Maintenance

Inspection should be performed during the summer months as soon as the streams have subsided from the spring rains. Emergency repairs can be made immediately. Less urgent repairs can be scheduled for the early fall before cold weather while the streams are at their lowest stages.

The river-crossing maintenance cost may be estimated and budgeted a year in advance. After the first inspection, costs are reduced because the original reports may be revised each year. The corrective measures each year will tend to eliminate the soft spots in the stream bed and vulnerable areas in the pipe crossing, thereby stabilizing the crossing and reducing the possibility of future difficulties.

### Insurance of River Crossings

River crossings are recognized by insurance groups to be the weakest point. In most cases the experience record of river crossings make them an undesirable risk. If insurance is written at all, there are usually so many limitations and reservations so that it is not attractive to the pipeline company.

It is the feeling of most companies that if their river crossings cannot be insured without limitations and riders, then the less hazardous installations need not be insured at all; consequently many of the major pipeline companies are self-insured.

Proper periodic preventive maintenance reports performed and submitted by competent personnel would give the insurance companies more confidence and would result in more insurance with fewer limitations being written.

# Effect of crude gravity on steam and power requirements

BY W. L. NELSON
Technical Editor—Refinery Consultant

TABLES 1 AND 2 indicate the approximate yields, sizes of process units, and steam and fuel consumptions of refineries operating on crude oils which range in gravity from 12.7° to 47.7° API. Although each oil would be processed differently in actual plants, an attempt was made here to keep the operations on a comparable basis. All of the crude oils were topped and reduced to distill material boiling up to 900° F., and the portion boiling between 550° and 900° F. was catalytically cracked. Residue above 900° F. was viscosity broken, and 60% of the straightrun gasoline was catalytically reformed. This extent of reforming is somewhat unfair to the lowest-gravity crude oils because they contain high-octane gasoline that normally does not need reforming.

Fuel and steam requirements for the various units were estimated from Tables 1 and 2 of Process Costimating No. 8 (April 14, 1958, p. 129) in a manner similar to that used in Process Costimating No. 9 (April 21, 1958, p. 177).

It is evident that crude-oil gravity does not have a marked effect on the amount of fuel consumed or the amount of steam used. Low-gravity crude oils require more utilities for viscosity breaking, whereas high-gravity oils need more utilities for topping and reforming, with a resulting total requirement that is much the same for all gravities of crude oil. However, in actual practice, the higher gravity crude oils would often be processed for lubricating oils or wax, which greatly increases the utility requirements, and in many instances low-gravity crude oils would not be as completely processed as contemplated herein.

**TABLE 1—YIELDS AND PROCESSING UNITS FOR VARIOUS GRAVITIES OF CRUDE OILS**

| | Bolivar district | Tembla-dor | T.J. Med. | Oficina | San Joaquin | Cuma-rebo |
|---|---|---|---|---|---|---|
| API gravity | 12.7 | 21.4 | 26.3 | 33.0 | 41.8 | 47.7 |
| Yields, %: | | | | | | |
| Gasoline and LPG | 24.6 | 40.8 | 37.5 | 53.3 | 61.1 | 64.8 |
| S.R. distillates and kerosine | 7.1 | 15.5 | 16.1 | 15.1 | 14.2 | 20.6 |
| Bunker C | 53.2 | 30.0 | 34.0 | 17.5 | 10.5 | 5.4 |
| Vaporized, % | 40.8 | 67.0 | 62.2 | 80.6 | 88.3 | 94.6 |
| Process units, capacity as per cent of crude capacity: | | | | | | |
| Topping | *50.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Reforming | .... | 6.8 | 12.9 | 18.7 | 24.0 | 29.6 |
| Visc. breaking | 59.2 | 33.0 | 37.8 | 19.4 | 11.7 | .... |
| Cat cracking | 30.4 | 39.9 | 23.9 | 33.4 | 32.5 | 22.6 |
| Polymerization | 1.8 | 2.4 | 1.3 | 1.9 | 1.8 | 1.3 |
| Lt.-oil treating† | 26.8 | 41.1 | 30.8 | 35.7 | 34.1 | 33.9 |
| By standard realization: | | | | | | |
| Per cent overhead products | 41.4 | 60.3 | 59.0 | 77.1 | 84.3 | 93.7 |
| Fuel, steam, water and power, cts. per bbl. (Gulf 1955) | 8.1 | 10.6 | 10.3 | 13.5 | 14.8 | 16.4 |

*In half of the plants the crude will go straight to the cracking plant. †Considered as kerosine or distillate, cracked gasoline, and poly gasoline.

**TABLE 2—EFFECT OF CRUDE GRAVITY ON THE FUEL AND STEAM REQUIREMENTS OF SIMPLE REFINERIES**
(Basis: M.B.t.u. and lb. steam per bbl. crude oil)

| | Bolivar Dist. 12.7° API | | Temblador 21.4° API | | T.J. Med. 26.3° API | | Oficina 33° API | | San Joaquin 41.8° API | | Cumarebo 47.7° API | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M.B.t.u. | Steam | M.B.t.u. | Steam | M.B.t.u. | Steam | M.B.t.u. | Steam | M.B.t.u. | Steam | M.B.t.u. | Steam |
| Topping | 22.5 | 20.0 | 55.0 | 40.0 | 53.0 | 40.0 | 65.0 | 50.0 | 70.0 | 50.0 | 90.0 | 55.0 |
| Reforming | .... | .... | 21.8 | 5.1 | 41.3 | 9.7 | 59.8 | 14.0 | 76.8 | 18.0 | 94.6 | 22.2 |
| Visc. breaking | 112.9 | 17.8 | 62.6 | 9.9 | 71.7 | 11.3 | 36.8 | 5.8 | 22.2 | 3.5 | .... | .... |
| Cat cracking* | 218.0 | 12.2 | 285.0 | 16.0 | 171.0 | 9.6 | 239.0 | 13.4 | 232.5 | 13.0 | 161.5 | 9.1 |
| Polymerization | 3.4 | 2.7 | 4.5 | 3.6 | 2.5 | 1.9 | 3.6 | 2.8 | 3.4 | 2.7 | 2.5 | 2.0 |
| Lt.-oil treating | .... | 8.0 | .... | 12.3 | .... | 9.2 | .... | 10.7 | .... | 10.2 | .... | 10.2 |
| | 356.8 | 60.7 | 428.9 | 86.9 | 339.5 | 81.7 | 404.2 | 96.7 | 404.9 | 97.4 | 348.6 | 98.5 |
| Coke credit | 25.8 | | 33.9 | | 20.3 | | 28.4 | | 27.6 | | 19.2 | |
| | 331.0 | | 395.0 | | 319.2 | | 375.8 | | 377.3 | | 329.4 | |
| Generation of steam and elect. | 83.0 | | 119.0 | | 101.7 | | 132.0 | | 133.0 | | 134.7 | |
| | 414.0 | | 514.0 | | 421.0 | | 508.0 | | 510.0 | | 464.0 | |
| Cts. per bbl., Gulf 1955 | 8.5 | | 10.5 | | 8.65 | | 10.4 | | 10.4 | | 9.5 | |

*Including gas-engine-driven blower.

# MISSION VALVES WERE USED

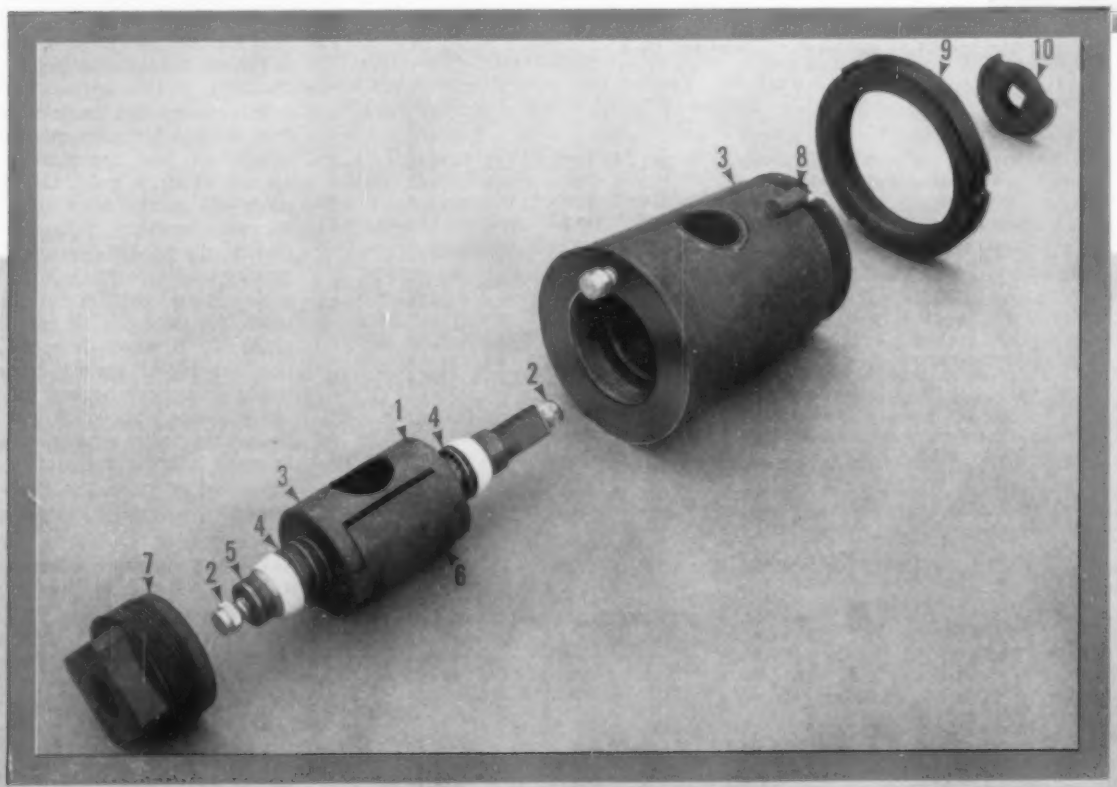
MISSION WAS READY when asked for a valve that could be used in an ultra-pressure unitized Christmas Tree. Mission had a balanced stem valve—easily adaptable to a unitized tree or manifold—that had been proven by three years laboratory testing and field use. A leading service company has been using these valves in service so severe that no other valve had been successful.

These valves were easily adapted to the unitized tree design because they were compact, simple, dependable, and trouble-free. Accordingly, Mission engineers designed a tapered body with no flanges or threaded connections. In addition to the metal-to-metal tapered seal, various combinations of resilient seals have been developed to meet producers requirements.

Largely because of these valves, the unitized design promises to be the greatest Christmas Tree advance in years.

Mission makes an extensive line of valves in a variety of pressure ratings and sizes. This Mission Valve can be adapted to unitized tree designs of other manufacturers. In addition, Mission Valves are well adapted to all Christmas Tree designs—both unitized and conventional—both single and multiple string. They are also used on high pressure manifolds and for drill stem test valves.

For more information on the Mission Valve used on the first O-C-T UNITREE, see the exploded view shown below. For full information on the complete line of Mission Valves, contact your Mission representative, your supply store, or your well head manufacturer.




This photograph shows important features of a partially disassembled Mission 30,000-pound test valve. These features include: (1) the split, wedge-proof, cylindrical core, (2) the high-pressure grease fittings that fill the automatic lubrication system and pack the space behind both stem packings, (3) the Missionized® core and body surfaces that minimize friction and prevent galling, (4) the springs that supply an initial load on the tapered Teflon-and-bronze stem sealing assemblies, (5) the resilient supplementary stem seals, (6) the half-circle grease groove which mates with another half-circle groove in the body when the valve is closed, (7) the cover which features a metal-to-metal seal instead of plastic or other non-metallic seals, (8) the guide pin which aligns the valve in the tree, (9) the locking ring which holds the valve in place and (10) the external stop which also indicates whether the valve is open or closed. Most features of this valve are also included in standard Mission Valves of lower pressure ratings.

*Trademark of Oil Center Tool Company

# IN THE FIRST UNITIZED TREE

A 30,000-pound test Mission Valve has been removed from the first O-C-T UNITREE*. Notice the balanced stem construction, the full round opening, the tapered "zero clearance" body, the locking ring for the valve and one version of the pressure-actuated resilient seal arrangements around the flow passage.

*Nothing but the finest will bear the name of* **MISSION** MANUFACTURING CO.

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# GUARANTEED PURITY!

## Argon of 99.995% minimum purity

## Guaranteed by LINDE!

The inert argon welding gas you get from LINDE is now *guaranteed** to contain *less than 50 parts per million* of impurities. And it's LINDE's regular industrial argon—not a special, extra-cost grade. You get this extremely high purity *on delivery* to you, regardless of the way the argon is delivered.

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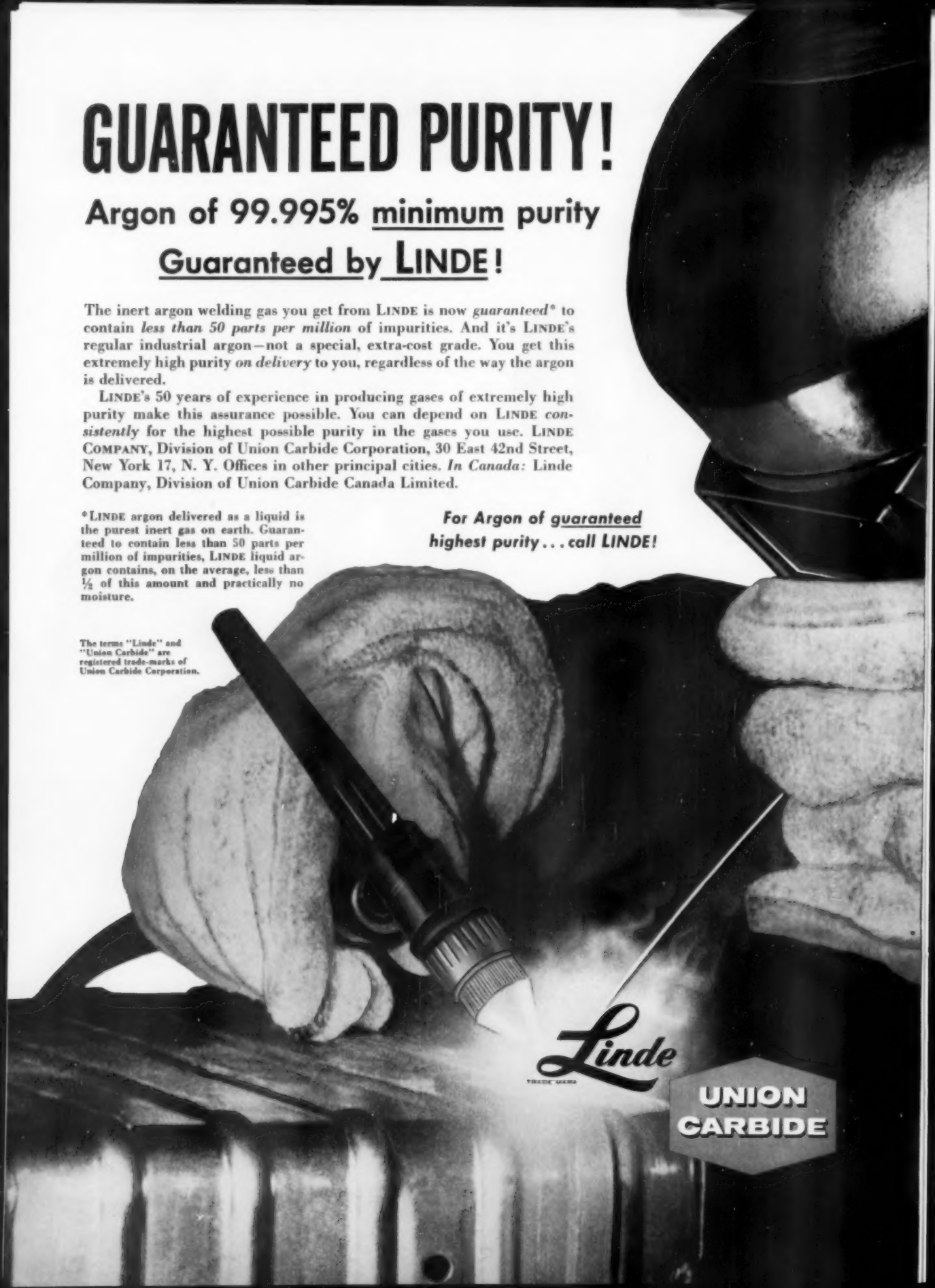

# Major construction in Gulf Coast aimed at upgrading products, expanding capacity

**SHADED PORTION** of map is area covered in this survey.

• **Atlas Processing Co.** will complete a 3,800-bbl. UOP Penex isomerization unit and a 5,000-bbl. pentane splitter at Shreveport, La., May 1958.

• **Chemoil Corp.** may build a new plant between New Orleans and Raton Rouge, La., with probable completion set for 1960; or may buy an existing plant to start operation July 1958 or January 1959.

• **Cities Service Refining Corp.** will add 4,800 bbl. of vapor-phase butane isomerization by June 1, 1958, at Lake Charles, La.

• **Esso Standard Oil Co.** will complete third quarter 1958, a 27,000-bbl. Powerformer as part of a $46,000,000 expansion program at Baton Rouge, La. A 10,000-bbl. Esso sulfuric acid alkylation unit will be completed September 1958 by Foster Wheeler Corp. Gas-oil cracking will be increased 5,000 bbl. by July 1958.

• **Gulf Oil Corp.** will complete a $4,000,000, 10,000-bbl. pentane isomerization unit (Penex) by late 1958. **Procon, Inc.,** has contract. Early in 1959, Platforming capacity will be increased another 12,000 bbl.

• **Humble Oil & Refining Co.,** at Baytown, Tex., will increase fluid cat cracking 5,000 bbl. by April 30, 1958; Hydrofining 6,000 bbl. by May 21, 1958; catalytic polymerization 1,400 bbl. by July 1, 1958. **Foster Wheeler Corp.** has contract for cat cracker. **Ralph M. Parsons Co.** has the Hydrofiner.

• **Lion Oil Co.** is possibly considering a new plant 20 miles upriver from New Orleans.

• **Magnolia Petroleum Co.** will complete a 100,000-bbl. atmospheric distillation unit and a 32,000-bbl. vacuum unit to charge topped crude (both to replace some existing capacities) at Beaumont, Tex., by August 1958. **Foster Wheeler Corp.** has contract for crude unit, and will also complete a 30,000-bbl. Socony reformer by September 1958.

• **North American Petroleum Corp.** has bought site at Corpus Christi, Tex., for a new plant, but plans are still in discussion stage.

• **Pontiac Refining Corp.** has let contracts to **Fluor Corp., Ltd.,** for redesign and modification of a crude unit, and design and construction of a 5,000-bbl. Unifiner at Corpus Christi, Tex. Cost is $1,500,000.

• **Shell Oil Co.** will complete September 1958, a $7,300,000, 20,000-bbl. UOP Platformer and a 16,000-bbl. Sinclair-Baker reformer at Norco, La. **Procon, Inc.,** has contract for Platformer. Auxiliary facilities will be built by **Foster Wheeler Corp.** and **J. F. Pritchard Co.**

• **Southland Co.** has bought site at Black Point, Fla., for a proposed $8,000,000, 15,000-bbl. plant.

• **Sunshine State Refineries, Ltd.,** plans to complete late 1959 or early 1960, a 25,000-bbl. plant at Plant City, near Tampa, Fla. It will include a 5,000-bbl. Platformer, a 10,000-bbl. Unifiner, a Thermofor, and an alkylation unit. **Kaiser Engineers** has design.

• **The Texas Co.** will increase fluid cat cracking 60,000 bbl. by May 1, 1958, at Port Arthur, Tex. **M. W. Kellogg Co.** has contract.

**Next month's Refinery Construction Report will cover the Rocky Mountain-Mid-Continent area. It** will appear in your May 26 issue. For a complete picture of refinery construction under way or planned in the United States and Canada, keep up with this monthly Journal feature.

## the new Welex "DM" and "DC"

# BRIDGE PLUGS

### insure a positive seal

The new Welex "DM" and "DC" Bridge Plugs are designed solely for one purpose: to give you the best pressure-tight temporary or permanent bridge at any desired depth at the most economical price to you. With the Welex Bridge Plug, you have positive setting action, three seal rings to insure a positive seal at any depth, a plug designed to withstand higher pressure than is safe to apply to your casing, a permanent or temporary bridge that may be drilled later to re-enter lower zones, a plug that will last longer in salt water, yet a plug that, most of all, is economical to you. Made of high strength drillable magnesium alloy and high strength drillable cast iron, the Welex "DM" and "DC" Bridge Plugs are your best buy when you desire effective sealing with a more durable plug at the most economical price.

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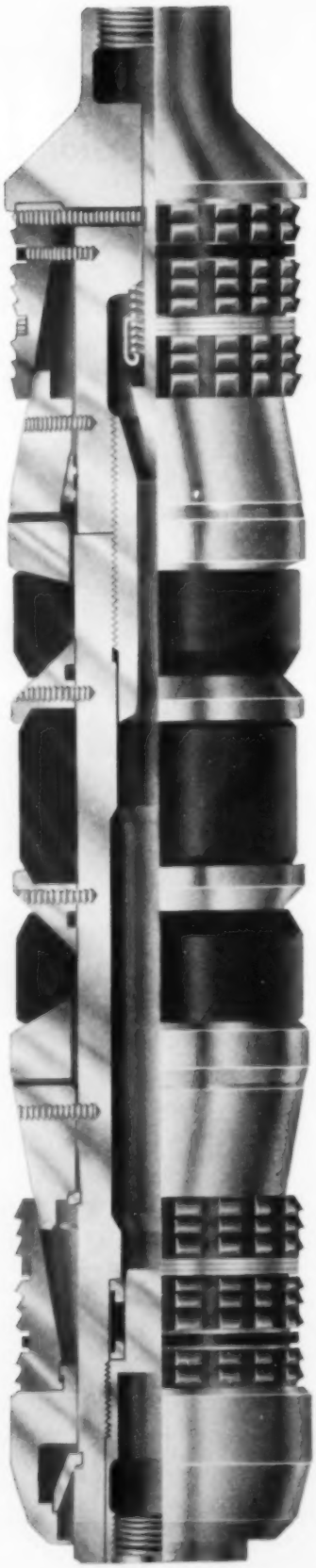
Division Offices in Dallas, Denver, Houston, Los Angeles, Midland, New Orleans, Tulsa and Wichita. Districts in all major oil centers. Subsidiaries in Canada, Peru and Venezuela.



# Divider can solve spooling problem

A DIVIDER for counterbalance spooling is the answer to a constantly growing demand for line storage on rotary-type workover rig hoists.

This type of setup can be used successfully only on counter-balance spooling. The drum is grooved or a split core is used from flange to flange. A place is machined near the middle of the grooved core to fit the divider to a grooved drum which has the riser end filler on the storage side and starting end filler on the working side.

Rotary-type workover rigs now use a short, helical-grooved split core, on which only two layers of line are used. There is a small place for storage, but not enough to work out a cutoff system as used on rotary drilling rigs.

Counterbalance spooling makes it possible to work with heavy loads on four, five or six more layers of line and to develop the dual-drum operation. This also makes it possible to move the divider across the drum to increase or decrease your storage side of the drum and still maintain perfect counterbalance spooling of your wire line on both the storage side and working side (two drums in one).

For better rotary-workover line safety and economy, the line threader can be welded to the divider you are now using.

This line threader can be used only in connection with single-crossover pyramid-grooved drums or split cores which will accurately spool three layers of line; or with counterbalance - grooved drums or split cores on which four, five, or more layers of line can be spooled.

In using either method of spooling, you can shorten up the working side of the drum which will make a better fleet-angle condition on the working side, where short masts are used; and give space for more line storage on the storage side.

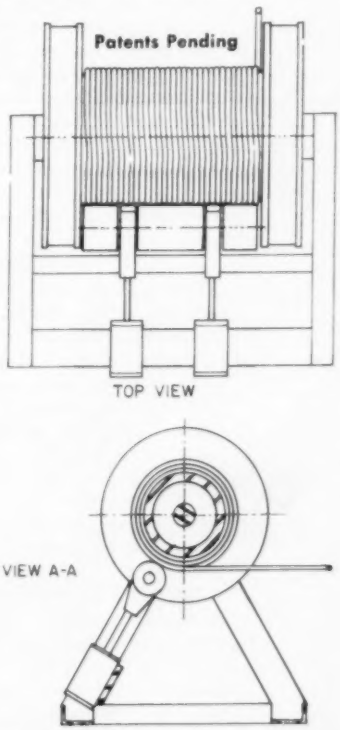
This makes it practical to set up a cutoff procedure to change the crossover position of the line on the drum and to change the load-lifting position in the blocks.

Taken from LeBus-International Engineers, Inc., wire-line-spooling handbook.

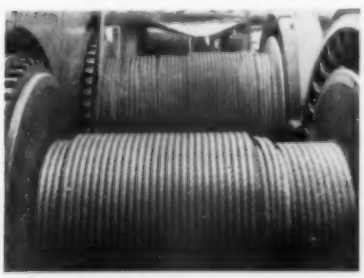
### Wire Line Friction Roller

The line drawing (Fig. 1) illustrates a new version (not in detail) of a pressure roller, used in connection with winch loose-line spooling; such as used on winch trucks, drag lines and light hoisting.

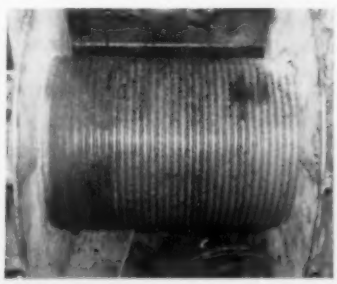
This pressure roller actuated by springs, air, or hydraulics, is built to provide a cambering action or movement of the roller whereby the greatest amount of roller pressure is exerted against the last wrap of line being spooled across the drum.



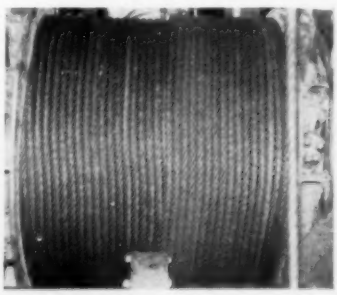

**LOOSE-LINE** horizontal spooling, using pressure roller actuated by springs, air, or hydraulics. Fig. 1.



**HOISTING DRUMS** spooling 8½ layers of line. Note line cutting in, unsafe in wire-line spooling. Drums are too wide to have workable fleet angle.



**COUNTERBALANCE** spooling with drum flange spacers narrows the distance between the drum flanges from 50 to 40 in., a 20% reduction.



**A TOTAL** of 10½ layers are shown above on the remodeled drum. The smooth layers will permit lifting of heavier loads, safer and faster.

These are the steps in

# Estimating combustion heats

## of aviation gasolines

THE NATIONAL Bureau of Standards has developed a convenient, reliable method for estimating heats of combustion of aviation gasolines.

The method does not require elaborate calculations nor extensive analytical work, but is based on an empirical equation relating heat of combustion to the proportions of various hydrocarbon types present. Adaptable for use by oil refineries, the procedure is expected to prove useful in checking aviation gasolines for conformance to military specifications.

### 1. Earlier Work

Jet-propelled aircraft — both manned and unmanned — require increasingly better performance of liquid propellants. Hence, military standards for fuels are becoming more exacting. One of the specifications stipulated in military contract bids is a highly accurate value for the fuel's net heat of combustion, but this property can be measured only by complex and expensive apparatus not available to most refineries.

Seeking a convenient means for estimating net heat of combustion, George T. Armstrong, Ralph S. Jessup, and Thomas W. Mears, of the bureau's staff have been investigating the relationships between net heat of combustion and other more easily measured properties of aircraft fuels.

**Is aniline point enough? . . .** Investigations sponsored by the Navy Bureau of Aeronautics showed that the net heat of combustion of a well-defined class of fuels can be expressed as a linear function of the product of the aniline point[1] of the fuel in degrees F. and the gravity of the fuel in degrees API—in other words, the aniline-gravity product. However, a different equation usually is necessary for each class of fuel. Also, it was clearly shown that the net heat of combustion is a function not only of the aniline-gravity product but of other variables as well.[2]

This is a summary of Technical Report 2131 of the National Bureau of Standards, U. S. Department of Commerce, Washington 25, D. C.

**Other variables . . .** In recent work for Wright air development center, Department of the Air Force, measurements of the following properties were made on 33 grade 115/145 gasolines and 7 grade 100/130 gasolines: (1) heat of combustion; (2) the aniline-gravity product; (3) hydrogen content; and (4) composition in terms of the various hydrocarbon types.[3] Data obtained from these measurements were used to derive empirical relations between net heat of combustion and other properties given above.

**Hydrocarbon-types function . . .** An approximate linear relationship was found in each case; but the accuracy of the estimated heat of combustion was much better in some relationships than in others. This is apparent from the standard deviation of the measured heat of combustion from that calculated for each measured physical property as listed below:

| | Per cent |
|---|---|
| Aniline point | 0.14 |
| API gravity | 0.26 |
| Aniline-gravity product | 0.12 |
| Hydrogen content | 0.14 |
| Composition in terms of hydrogen types | 0.07 |

These percentages indicate that the most accurate means so far investigated for estimating heat of combustion of aircraft fuel is the method based on the composition of the fuel in terms of hydrocarbon types.[4]

### 2. Developing the Method

In arriving at this method, the fuels first were analyzed by a standard ASTM procedure of silica gel adsorption into saturates, olefins, and aromatics. The saturate fractions were further analyzed for paraffins and naphthenes. Measured heats of combustion were then fitted by the method of least squares to a linear combination of the weight percentage of pariffins (P), naphthenes (N), olefins (O), and aromatics (Ar). The equation which relates net heat of combustion

$[Q_p \text{ (net)}]$

in British thermal units per pound, to weight per cent of the hydrocarbon types is as follows:

$$Q_p \text{ (net) B.t.u./lb.} = 190{,}892\ (P) + 188.80\ (N) + 176.73\ (O) + 172.65\ (Ar).$$

**Empirical equation . . .** It may be assumed that in a fuel having boiling range and other properties limited by specifications such as those required for aircraft fuels, the hydrocarbons of which the fuel may be composed will be limited to a small group of related compounds within each hydrocarbon type. Therefore, the range of possible values of heat of combustion would be considerably less than in fuels which do not measure up to the specifications.

As a consequence, mixtures within such a group of compounds will have a characteristic heat of combustion per unit weight which will not vary from one mixture to another. Thus, it might be expected that the heat of combustion per unit weight of a fuel would be a linear combination of the percentages by weight of the hydrocarbon types as shown in the preceding equation.

The complete calculation of the heat of combustion of a fuel by analyzing all of its molecular components and averaging their heat of combustion is theoretically possible, but such an experiment is not presently feasible. On the other hand, the bureau's method is well within the testing capacity of most oil companies' laboratories.

### References

1. Aniline point is the minimum equilibrium-solution temperature for equal volumes of aniline and of sample.

2. For further technical details, see "Relations Between Net Heat of Combustion and Aniline-Gravity Product of Aircraft Fuels," by Ralph S. Jessup and Joseph A. Cogliano, ASTM Bull. 201, p. 55 (1954), and "Net Heat of Combustion of AN-F-58 Aircraft Fuels," by Simon Rothberg and Ralph S. Jessup, Ind. and Eng. Chem. 43, 981 (1951).

3. These gasolines were selected from over 200 samples submitted by 39 oil refineries.

4. "Net Heat of Combustion of Aviation Gasoline and Its Correlation With Other Properties," by George T. Armstrong, Ralph S. Jessup, and Thomas W. Mears, I&EC's Chem. and Eng. Data Series (in press).

## Check valve is key to . . .

# Starting gas-engine-driven compressors

ALL OF the gas-engine-drive compressors in Esso's Baton Rouge refinery must be provided with a way to rotate the engine for starting purposes.

Rotation is obtained by using a starting-air system and consists of the following: A small motor-driven air compressor provides high-pressure air, a high-pressure air drum provides air storage, and piping is used to connect the equipment together.

The air pressure required to "roll over" large machines is at least 175 psig. and not more than 225 psig. The equipment is arranged as shown in Fig. 1.

The air rolls the machine in the following manner: At the time the main starting-air valve is opened to the engine, air is admitted to each power cylinder by an air-distributor system which works very much like the distributor in the ignition system of an automobile.

Each power cylinder is equipped with a starting-air check valve as shown in Fig. 2. This check-valve assembly permits entry of the starting air at the right time and prevents the burning fuel-gas mixture from backing up into the starting-air system when the compressor is running. It also permits relieving compression on the engine when the flywheel must be barred to the starting position.

### Operation of Check Valves

Here's how the check-valve assembly in Fig. 2 works:

- By throwing the three-way cock to the on position, starting air is admitted above the stainless-steel ball A.
- This forces ball downward against tension of spring B, seating the ball against seat C, preventing leakage of starting air when barring. These valves thus serve as compression relief valves when it is desired to bar the engine over to its starting position.
- After engine has been barred to starting position throw three-way valve to off position. All check valves now return to and are held on their seats by spring B.

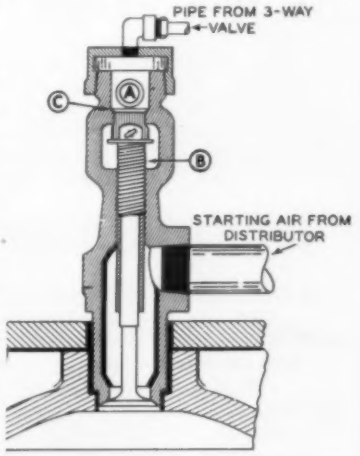
### Lubricating System

The gas-engine-driven compressors are equipped with a very efficient lubricating system. The crankcase lubricating system supplies oil under controlled pressure to all main bearings, the governor case, timing gears, power cylinder walls, pistons, and rings.

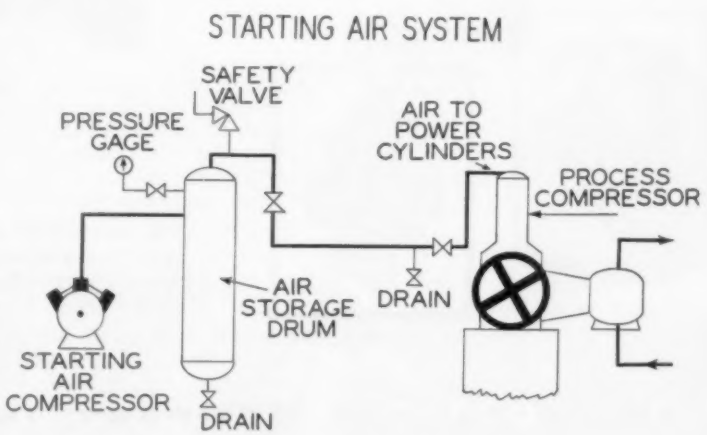
This system supplies large quantities of oil to carry away the heat caused by friction and it is essential that the correct pressure be maintained. The oil temperature from the oil cooler to the main bearings header should be held between 130° and 140° F.

Forced-feed lubricators are used to supply oil to the compressor cylinder walls, compressor pistons and rings, and piston-rod packing. A one-shot lubricator is used on many machines to supply oil to the power-cylinder valve stems.

A sight-feed oiler is used to supply lubricating oil to the fuel-gas mixing valves on the Ingersoll-Rand compressors.




**AIR-STARTER** check valve. Fig. 2.




**ARRANGEMENT OF EQUIPMENT** for starting-air system. Fig. 1.

This material taken from process-training-program manual, Baton Rouge, La., refinery of Esso-Standard Oil Co.

# LARKIN TUBING HEADS

## *unmatched*

## FOR DEPENDABILITY

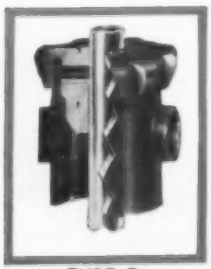
The Larkin Type SR Tubing Head is a slip suspension head, equipped with a Neoprene Stripper which serves as a blow-out preventer and oil saver while tubing is being pulled or run. It is very suitable where higher pressures might be encountered.

## FOR VERSATILITY

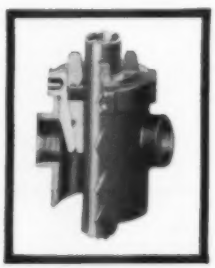
The Larkin Type R Tubing Head is a conversion from the Type SR Head. This ease of conversion makes it possible to use the same stripper adapter and Neoprene stripper when working on any well equipped with a Larkin Tubing Head.

## FOR ECONOMY

A new member of the Larkin Well Head Line, the Type L Tubing Head fills a need in low pressure areas where economy may be effected with complete safety. It is forged steel construction, full opening, 2000 lb. psi, top of body threaded 7" API to accommodate control equipment, hinged three-segment slips, 2" or 3" side outlets.



TYPE R



TYPE L

For detailed information on these and other Larkin Tubing and Casing Heads, please refer to your Larkin Catalog or talk to your Larkin Representative. All Larkin Equipment is available through your supply store.

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LARKIN LEADERSHIP HAS BEEN EARNED BY YEARS OF DEPENDABLE PERFORMANCE

**THIS ULTRAMODERN** drilling tender joins fleet servicing South Texas offshore operations.

# Drilling fleet expands

THREE new large vessels last week joined the fleet of sea-going work boats serving offshore drilling operations of South Texas drilling contractors and oil operators.

They include a 136-ft. tender and supply boat, a 95-ft. crew boat, and an 85-ft. combination crew and cargo boat. Owners are Caspary & Wendell, boat operators, Rockport, Tex.

Their triple christening and launching at Burton Construction & Shipbuilding Co. yards at Port Arthur, Tex., marked the completion of one of the largest work-boat orders ever placed with a Texas shipyard. They are duplicates of three service boats previously delivered on the $1,200,000 order.

The large tenders are the Belmont and Hialeah, and the 95-ft. crew boats, the Gallant Man and Count Fleet. The combination crew and cargo boats, which will be used to supplement the four larger vessels, are the Swap and the Assault.

All are twin-screw driven. The two big tenders have four tandem diesels, developing 1,200 hp. and giving them a speed of 14 m.p.h. There also are four tandems on the 95-footers, but their power is translated into speed for crew comfort. The two smaller crew-cargo boats have only a single pair of engines each, and are somewhat slower.

Caspary & Wendell have another 95-ft. crew boat, the Whirlaway, which is identical with the Gallant Man and Count Fleet. When launched a year ago on a separate construction order it marked a new departure in crew boats. Cabins on all of them are air-conditioned.

In addition to the fleet they own, Caspary & Wendell operate another similar 95-ft. crew boat, the Chevron, for Standard Oil Co. of Texas, and four other oil-company and contractor-owned work boats servicing drilling rigs in bay operations along the central and lower Texas coast.

## Who's getting the drilling contracts

**Ace Drilling Co.,** Dallas, has two new contract jobs under way in Rapides Parish, Central Louisiana. One is a 7,500-ft. Wilcox test for Thomas D. Humphrey & Sons, Ltd., at a wildcat location about 1¼ miles northwest of Roger Bassett's recently completed Wilcox oil-discovery well of Ruby field. The other is a 5,300-ft. Wilcox well in the North Big Island area, where it is drilling for W. P. Ballard, Jr., and Cordell & Cordell. Ace has just completed an oil well for the latter operators in the original Big Island field, about 6 miles southeast.

**Delta Drilling Co.,** Tyler, Tex., has a new deep wildcat operation scheduled in northern Calcasieu Parish,

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If mud gets to your joint threads, it can wash out a string in a hurry. 'Bestolife Lead Seal Tool Joint and Casing Compound gives maximum, *tight* joint make-up, keeps mud out. Standard of the oil country for over twenty-five years. Unconditionally guaranteed. Packed in 1¼, 5, 20 and 50 lb. containers. Sold by leading supply houses throughout the world.

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southwestern Louisiana. It is a contract job for W. W. F. Oil Corp. Location, at 1 Anderson, in 32-8s-9w, is about 7 miles northwest of Lake Charles. It is about 6 miles north of Lockport field, nearest production, and about 7 miles southeast of East Perkins field.

## Gordon Jackson to Head Air-Gas Drilling Concern

Well Completions, Inc., pioneer in the development of air and gas drilling, announces the election of Gordon Jackson to the presidency and active management of the firm.

JACKSON

Jackson, who has been associated with work of the company for several years, has a background of 20 years of engineering and management experience with oil field service firms. He is a graduate engineer.

In his new capacity, Jackson will direct the increased development of the firm's air and gas drilling services. Associated with him in this development is Robert W. Sneed, executive vice president.

Main offices of the firm continue at Denver.

**Gulf Coast Drilling & Exploration Co.,** Laurel, Miss., has moved a heavy rig to Florida for a deep test it has contracted to drill for Pan American Petroleum Co. Pan American's location is about 5 miles of Bruce, in Walton County, in the state's panhandle sector. Plans call for drilling to 10,000 ft. making this one of the deepest tests ever drilled in that part of the state.

**Grady Roper** is contractor on a new deep wildcat test William T. Burton Industries, Inc., of Sulphur, La., is starting in western Evangeline Parish, South Louisiana. Location, at 1 Forest, in 29-4s-2w, is about 6 miles west of Redell field, and about 5 miles northeast of Caster Creek field, in eastern Allen Parish. Permit is for a 10,000-ft. test.

**Inca Drilling Co.** has a new wildcat operation scheduled for southwestern Calcasieu Parish, in southwestern Louisiana. It is a contract job for Beck Oil Co., of Houston, at 1-A Stiine & Kinney, in 4-11s-11w. Location is about 1½ miles southwest of Pine Ridge field, nearest production. A 9,500-ft. test is planned.

PIPELINE

CONSTRUCTION REPORT

# Who's Laying Line—and Where

PIPELINE activity reported here is compiled from surveys conducted by The Oil and Gas Journal among pipeline companies and contracting firms. Projects listed include those proposed, contracted, and under way.

## U.S. Crude-Oil Pipelines

• **Belle Fourche Pipeline Co.**
Project: 30 miles of 6-in. from Donkey Creek pool to Fiddler Creek pool in northeastern Wyo. Will later build a line from Fiddler Creek to connect with Butte Pipe Line Co. near Osage, Wyo.
Status: Planned.

• **Cape Pipe Line Co.** (Sun Oil Co., Cities Service Co., Atlantic Refining Co.)
Project: Line from lower Delaware Bay to Philadelphia.
Status: Planned.
Completion: 1960.

• **Cooperative Refinery Association**
Project: 6 miles of 6-in. in Washington County, Oklahoma.
Completion: Mid-June 1958.

• **Gillette Pipeline, Inc.** and **A. W. Hartwig, Inc.**
Project: A 102-mile line from Dead Horse Creek field to Casper, Wyo.
Status: Has applied for permit from Wyoming Public Service Commission.

• **Great Northern Railway Co.**
Project: 400 to 600 miles of 12 to 20-in. from Williston basin in Montana and North Dakota, to Clearbrook or St. Paul, Minn.
Status: Planned.
Contractor: **Pipe Line Technologists, Inc.** has completed feasibility study.

• **Humble Pipe Line Co.**
Project: 90 miles of 16-in. from Hawley to Comyn, Tex.
Status: Under way.
Contractor: **O. R. Burden Construction Corp.,** R. M. Jones, supt., office at Cisco, Tex.
Completion: Summer 1958.

• **Jayhawk Pipeline Corp.** (Colorado Oil & Gas Corp., National Cooperative Refinery Association)
Project: 197 miles of 12-in. from Meade to McPherson, Kans., and 42 miles of 10-in. from McPherson to Valley Center, Kans.
Status: Under way.
Contractor: **Pipe Line Technologists,** Houston, has engineering contract.
Completion: September 1, 1958.

• **Magnolia Petroleum Co.**
Project: 22 miles of 16-in. line offshore Louisiana, to move crude from West Cameron area.
Status: Contracts to be let by May 1, 1958.

• **Magnolia Pipe Line Co.**
Project: 40 miles of 16-in. from Hull Station to Beaumont, Tex., to replace several smaller older lines.
Status: Under way.
Contractor: **Panama Construction Co.**
Completion: May 10, 1958.

• **Offshore Gathering Corp.,** Houston.
Project: 364 miles of mostly 20-in. in Gulf of Mexico off Louisiana. (Dual line.)
Status: Proposed.

• **Service Pipe Line Co.**
Projeect: 30 miles of 12-in. from North Fork field, Wyoming, to the Salt Creek pump station.
Status: To start July 1, 1958, pending Wyoming Public Service Commission approval.
Project: 41 miles of 20-in. looping Fort Laramie to Glendo Junction, Wyo., and 35 miles of 20-in. looping from Welch to connect with system at Casper, Wyo.
Status: To start May 1, 1958.
Contractor: **O. R. Burden Construction Corp.,** Floyd Lewis, supt.
Completion: Fall 1958.

• **Shell Oil Co.**
Project: 20 miles of 6-in. from Vallecitos field in eastern San Benito County to main Bakersfield-to-Martinez line in Fresno County, California.
Status: Planned.
Completion: Late July 1958.

• **Shell Pipe Line Corp.**
Project: 2 miles of 6-in., 11 miles of 8-in., 11 miles of 12-in., 29 miles of 16-in., and 64 miles of 20-in. from Mississippi River delta area to New Orleans refining area.
Status: Under way.
Contractor: **Coates Field Service, Inc.,** has right-of-way acquisition and claims settlement.
Completion: December 1958.

• **Sinclair Pipe Line Co.**
Project: 150 miles of 20-in. from Teague, Tex., to Houston.
Status: Under way.
Contractor: **Lone Star Constructors, Inc.** has 143 miles; **Golightly Construction Corp.** has 6 miles.
Completion: July 1, 1958.

• **Texas-New Mexico Pipe Line Co.** (Sinclair, Texas Co., Tidewater, Empire)
Project: 512 miles of 16-in. from southeast corner of Utah to Jal, N. M.
Status: Under way.
Contractor: **Four Way Co., Inc.,** has 150 miles from Aneth field southeast. **Panama, Inc.,** has completed 362 miles from Cuba to Jal.
Completion: May 1958.

• **Union Oil Co. of California**
Project: 1 mile of 30-in. from proposed outer harbor terminal to Los Angeles outer harbor wharf, and 4 miles of 12-in. crude and bunker fuel line from proposed outer harbor terminal to Union's Los Angeles refinery.
Status: Planned.

## U.S. Products Pipelines

• **Alaska-Yukon Refiners & Distributors, Ltd.**
Project: Two lines: one 150 miles from Haines to Haines Junction, Alaska, linking with government Canol line; another from Tok Junction, on Canol line, to Anchorage.
Status: Proposed.
Completion: 1959.

• **Buckeye Pipe Line Co.**
Project: 50 miles of 10-in. from Syracuse to Utica, N. Y.
Status: Planned.
Completion: September 1958.

• **Cherokee Pipe Line Co.** (Continental Oil Co., Cities Service Oil Co.)
Project: 78 miles of 12-in. from Ponca City to Tulsa, Okla.
Status: Under way.
Completion: Summer 1958.
Project: Conversion of 400 miles of 10-in. crude line between Glenpool, Okla., and Wood River, Ill.
Status: Under way.
Completion: Summer 1958.

• **Columbia Gas System, Inc.**
Project: 37 miles of 6-in. from Kenova, W. Va., to Siloam, Ky.
Status: Proposed.

• **Emerald Pipe Line Corp., Phillips Petroleum Co., and The Texas Co.**
Project: 300 miles of 6-in. from Amarillo, Tex., to Albuquerque, N. M.
Status: To start in May.

• **Everglades Pipe Line Co.**
Project: 60 miles of 10-in. from Port Everglades, Fla., to Miami's International Airport and terminals south.
Status: Engineering study under way.
Completion: Late 1958.

• **Interstate Oil Pipe Line Co.**
Project: 16 miles of 4-in. LPG line from Baton Rouge to Plaquemine, La.
Status: Under way.
Contractor: **J. C. Campbell Construction Co.**
Completion: June 1, 1958.

• **Katy and New York Central Railroads**
Project: 2,000 miles of 10 or 12-in. from Houston through Kansas City, St. Louis, Indianapolis and Cleveland to Syracuse then down to New York City. A branch would go through Chicago to Detroit.
Status: Planned.
Contractor: **Williams Brothers Co.** has feasibility study.
Completion: November 1, 1959.

• **Laurel Pipe Line Co.** (Gulf Refining Co., Sinclair Pipe Line Co., The Texas Co.)
Project: 100 miles of 24-in. and 340 miles of line graduating down to 14-in. at the west terminus, from Philadelphia to Cleveland.
Status: Under way.
Contractor: **Pipe Line Maintenance & Construction Co.,** Camp Hill, Pa., has Susquehanna River crossing. **Missouri Valley Dredging Co.,** Omaha, Neb., has 6 miles of 24-in. from Eagle Point, N. J., to west bank of Delaware River, including Delaware River crossing, and 20 miles of 24-in. from west bank of Delaware River to Laurel's Booth station site in Delaware County, Pennsylvania. **Engineers Limited Pipe Line Co.,** San Francisco, has 106 miles of 24-in. from Booth station to Mechanicsburg station near Harrisburg, Pa. **Panama, Inc.,** Houston, has 78 miles of 20-in. from Mechanicsburg station to Duncansville station, and 113 miles of 18-in. from there to Aliquippa station in Beaver County, Pennsylvania, including Allegheny and Ohio rivers crossing. **Williams Brothers Co.,** Tulsa, has 106 miles of 14-in. from Aliquippa station to Cleveland.
Completion: August 1958.

• **Ohio Oil Co.**
Project: 265 miles of 12-in. from Wood River, Ill., to Chicago.
Status: To start July 1958.
Completion: 1958.

• **Phillips Petroleum Co.**
Project: 44 miles of 8-in. from Rocky Pump Station to Amarillo, Tex.
Status: Planned.

• **Underground Storage & Exploration, Inc.**
Project: 393 miles of 12-in. L.P.G. line from Moundsville, W. Va., to Newark, N. J., plus 95 miles of 6, 8-in. laterals to Mauch Chunk, Pa., and to Philadelphia.
Status: Proposed.

• **Union Oil Co. of California**
Project: 2 miles of 12-in. bunker fuel line from proposed outer harbor terminal to Los Angeles outer harbor wharf, and 4 miles of 12-in. crude and bunker fuel line

## PIPELINE CONSTRUCTION

from proposed outer harbor terminal to Union's Los Angeles refinery.
Status: Planned.

### U.S. Natural-Gas Pipelines

- **American Louisiana Pipe Line Co.**
Project: 7 miles of 16-in. and 5 miles of 12-in. from Second Bayou to Cameron, La.
Status: Under way.
Contractor: **Ford, Bacon & Davis Construction Corp.**
Completion: December 1958.
- **Arkansas Louisiana Gas Co.**
Project: A 300-mile line, plus gathering lines, from Tex.-La. coastal area to northern La., to connect with present system.
Status: Proposed.
- **Carnegie Natural Gas Co.**
Project: Two parallel lines to provide coke-oven gas to six Pittsburgh area plants: 9 miles of 55-in. and 4 miles of 43-in. each.
Status: Under way.
Contractor: **Williams Brothers Co.**
Completion: January 1, 1959.
- **Chicago District Pipeline Co.**
Project: 52 miles of 30, 36-in. between Joliet and Chicago, Ill.
Status: Approved by FPC examiners.
Completion: 1958.
- **Coastal States Gas Producing Co.** and **Southern Coast Corp.**
Project: 45 miles of 2 to 10-in. in Bee County, Tex. to connect presently shutin fields with Texas Eastern Transmission Corp.'s system.
Status: Planned.
- **Coastal Transmission Corp.**
Project: 94 miles of 12-in. between Monte Christo, Tex., and Robstown, Tex.; 175 miles of 20-in. between Robstown and Lochridge, Tex.; 102 miles of 22-in. between Lochridge and Beaumont, Tex.; 193 miles of 24-in. between Beaumont and Baton Rouge, La.
Status: Approved. Survey and right-of-way work under way.
Completion: February 1, 1959.
Project: 365 miles of 3 to 14-in. gathering lines at various locations on Texas and Louisiana Gulf Coast.
Status: Approved.
Completion: February 1, 1959.
- **Colorado Interstate Gas Co.**
Project: 66 miles of 30-in., 40 miles of 34-in., 109 miles of 26-in., and 100 miles of 24-in. from Springfield, Colo., to Pubelo, Colo.; 345 miles of 30-in. from Kit Carson, Colo., to Beatrice, Neb.; 24 miles of 22-in. Tex. Panhandle looping.
Status: Approved by FPC examiners. Delayed until 1959.
- **Commonwealth Natural Gas Corp.**
Project: 16 miles of 12-in. from Waverly to southeast of Wakefield, Va.
Status: Planned.
Completion: July 1, 1958.
Project: 13 miles of 18-in. from Chester to Petersburg compressor station in Va.
Status: Planned.
Completion: September 1, 1958.
- **Consolidated Gas Utilities Corp.**
Project: 21 miles of 12-in. and 10 miles of 8-in. at Altus, Okla.
Status: Approved.
- **Consumers Power Co.**
Project: 45 miles of 24-in. from Overisel field to Lansing Gas system in Mich.
Status: Has temporary FPC approval.
Completion: September 1, 1958.
Project: 45-mile, 24-in. line from Woodbury station to Laingsburg Junction, Mich.
Status: Planned for 1959.
- **Eastern Shore Natural Gas Co.**
Project: 34 miles of 8-in. and 90 miles of 6-in. from connection with Transcontinental Gas Pipe Line Corp., in Maryland, across entire length of Delaware to Salisbury.
Status: Approved.
- **El Paso Natural Gas Co.**
Project: 177 miles of 20-in. from Sonora plant, Sutton County, to Plains plant, Yoakum County, Texas.
Status: Approved.
Completion: August 1, 1958.
Project 203 miles of 30-in. Permian-San Juan crossover loops.
Status: Approved.
Completion: September 1, 1958.
Project: 94 miles of 34-in. San Juan main line loop.
Status: Under way.
Completion: June 1958.
Project: 13 miles of 20-in. and 66 miles of 16-in. Aneth line.
Status: Approved.
Completion: September 1958.
Project: 74 miles of 10-in. Yuma line loop.
Status: Has temporary approval.
Completion: August 1958.
Project: 500 miles of 34-in. from Twin Falls, Idaho to California border near Las Vegas, Nev.
Status: Planned.
Completion: September 1, 1959.
Project: 59 miles of 20-in. in Crane County, Texas, and 9 miles of various size field lines in Pecos County, Texas.
Status: Has temporary approval.
Completion: June 1958.
- **Gulf Interstate Gas Co.**
Project: 10 miles of 12-in. supply loop to Erath field, Vermilion Parish, Louisiana, and 9 miles of various size field lines in Acadia and Vermilion parishes, Louisiana.
Status: Approved.
Project: 10 miles of 20-in. loop in Jeffer-

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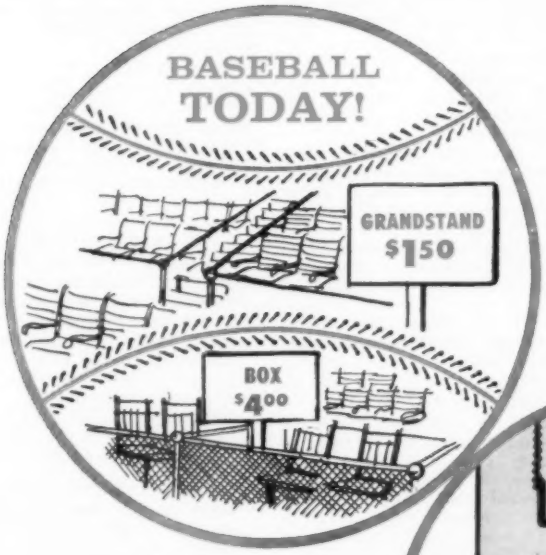


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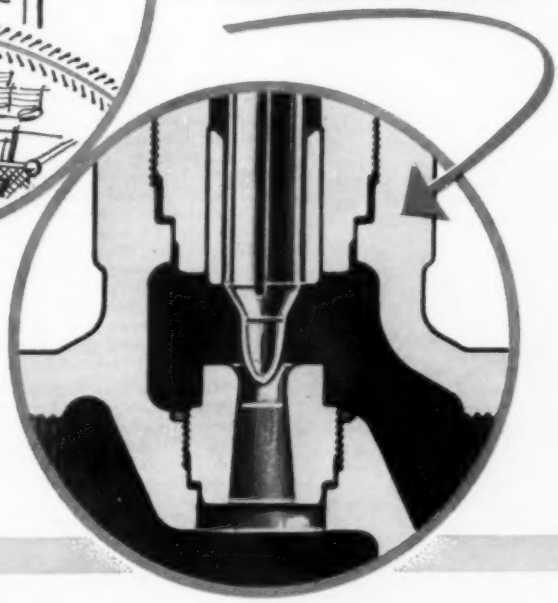

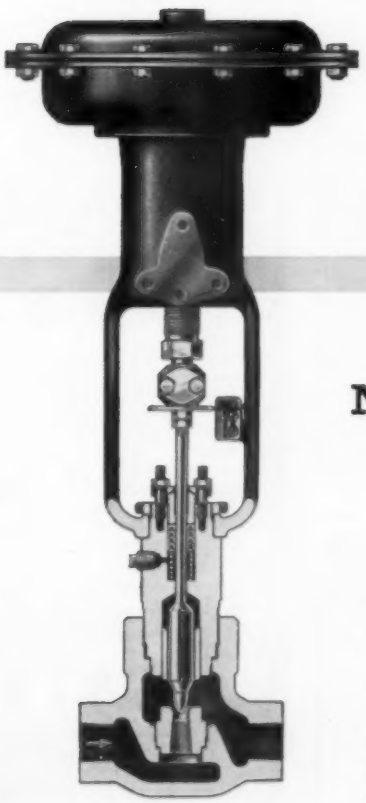

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son Davis and Vermilion parishes, Louisiana, and 3 miles of 6-in. loop in Cameron Parish, Louisiana.

Status: Has temporary FPC approval.

Project: 352 miles of 30-in. loop between Louisiana and Leach, Ky.; 54 miles of 24-in. lateral in Louisiana.

Status: Has temporary approval.

Completion: 1959.

• **Houston Texas Gas & Oil Corp.**

Project: 702 miles of 24-in. from Baton Rouge, La., to Kissimmee, Fla.; 139 miles of 18-in. and 101 miles of 20-in. from Kissimmee to Cutler, Fla.; 642 miles of 3 to 18-in. sales laterals in Florida. Main line to join Coastal Transmission's line from McAllen, Tex., to Baton Rouge.

Status: Right-of-way procurement under way.

Contractor: **Midwestern Constructors** has the 702 miles of 24-in.; **Harbert Construction Corp.** has remainder.

Completion: 1959.

• **Humble Oil & Refining Co.**

Project: 250 miles of 26 or 30-in. from Southwest Texas area to Houston, plus 200 miles of various size gathering lines.

Status: Planned.

• **Iron Ranges Natural Gas Co.**

Project: 70 miles of 6 to 16-in. in Mesabi Iron Range area.

Status: Pending FPC approval.

Completion: November 1, 1958.

Project: 63 miles of 12-in. between Duluth and Silver Bay, Minn.

Status: Pending FPC approval.

Completion: November 1, 1958.

• **Kentucky Gas Transmission Corp.**

Project: 21 miles of 26-in. to parallel its 20, 24-in. lines from its Foster regulating station in Bracken County, Kentucky, to Campbell, Ky.

Status: Approved.

• **Lone Star Gas Co.**

Project: 18 miles of 6-in. loop in Hamilton County, Texas.

Status: Planned.

Contractor: Company forces.

Completion: July 1, 1958.

Project: 11 miles of 16-in. relocation of line around Abilene, Tex.

Status: Planned.

Contractor: Company forces.

Completion: August 1, 1958.

Project: 12 miles of 12-in. replacement of line in Haskell County, Texas.

Status: Planned.

Contractor: Company forces.

Completion: June 1, 1958.

Project: 22 miles of 20-in. loop in Henderson and Navarro counties, Texas.

Status: Planned.

Contractor: Company forces.

Completion: October 1, 1958.

• **Manufacturers Light & Heat Co.**

Project: 3 miles of 12-in. from Wellsville to a point in Saline Township, Ohio; 8 miles of 12-in. in Brook County, W. Va.; 4 miles of 10-in. in Ohio County, W. Va.

Status: Approved.

• **Michigan Consolidated Gas Co.**

Project: 67 miles of 10 and 12-in. between Sears and Travers City, Mich.

Status: Under way.

Contractor: **Somerville Construction Co.;** Floyd Huduall, supt., office at Cadillac.

Project: 60 miles of 10 and 12-in. between Muskegon and Ludington, Mich.

Status: Under way.

Contractor: **Somerville Construction Co.,** jointly with **H. L. Gentry Construction,** Frank Morris, superintendent, office at Hart, Mich.

Project: 40 miles of 26-in. from storage fields in Michigan, to Consumers Power Co. distribution system.

Status: Has temporary FPC approval.

• **Michigan Wisconsin Pipe Line Co.**

Project: 33 miles of 4, 6-in., 2 miles of 12-in., 4 miles of 10-in., and 7 miles of 8-in. gathering lines in LaVerne Field, Harper County, Okla.

Status: Planned. Pending FPC approval.

Completion: October 1, 1958.

Project: 56 miles of 20-in. extension of LaVerne line, Harper County, Okla.

Status: Planned. Pending FPC approval.

Completion: October 1, 1958.

Project: 25 miles of 12-in. and 21 miles of 24-in. loops in Wis. and Mich.

Status: Planned. Pending FPC approval.

Completion: October 1, 1958.

• **Midwestern Gas Transmission Co.**

Project: Line from Portland, Tenn., to Minnesota-Canada border near Emerson, Man.: 670 miles of 30-in., 218 miles of 20-in, 371 miles of 16-in., 115 miles of 12-in., 70 miles of 10-in., 179 miles of 8-in., 147 miles of 6-in., 174 miles of 4-in., 106 miles of 3-in.

Status: Pending FPC approval.

• **Natural Gas Pipeline Co. of America**

Project: 389 miles of 36-in. loops along its line from Beatrice, Neb., to Chicago, to take gas from proposed line of Colorado Interstate Gas Co., and 91 miles of 30-in. loops along parts of its main line.

Status: Approved by FPC Examiner. Delayed until 1959.

Project: 337 miles of 30-in. between Fritch, Tex., and Beatrice, Neb., and 59 miles of 36-in. between Beatrice and Joilet, Ill., along existing system.

Status: Pending FPC approval.

Completion: 1959.

Project: 232 miles of 36-in. between Beatrice, Neb., and Joliet, Ill., and 258 miles of 36-in. and 21 miles of 26-in. between the Texas Panhandle and Beatrice.

Status: Pending FPC approval.

• **New York State Natural Gas Corp.**

Project: Will replace 12 miles of 20-in. with 30-in. and 13 miles of 12-in. with 20-in. in Pa.

Status: Planned.

• **North Carolina Natural Gas Corp.**

Project: 630 miles of 2 to 16-in. from near Mooresville, eastwardly across N. C.

Status: Under way.

Completion: 1958.

• **Northern Illinois Gas Co.**

Project 140 miles of 24-in. from East Dubuque, Ill., to Des Plaines, Ill.

Status: Pending FPC approval.

Completion: November 1, 1958.

• **Northern Natural Gas Co.**

Project: 18 miles of 20-in. from Dubuque, Iowa, to Menominee, Ill.

Status: Pending FPC approval.

Completion: November 1, 1958.

Project: 19 miles of 30-in. from South Sioux City to Oakland, Neb.

Status: Pending FPC approval.

Completion: November 1, 1958.

Project: 9 miles of 30-in. from Palmyra to Beatrice, Neb.

Status: Pending FPC approval.

Completion: November 1, 1958.

Project: 11 miles of 30-in. from Clifton to Tescott, Kan.

Status: Pending FPC approval.

Completion: November 1, 1958.

Project: 8 miles of 30-in. from Tescott to Bushton, Kan.

Status: Pending FPC approval.

Completion: November 1, 1958.

Project: 11 miles of 30-in. from Sunray, Tex., to Beaver, Okla.

Status: Pending FPC approval.

Completion: November 1, 1958.

Project: 8 miles of 30-in. and 44 miles of 16-in. from Beaver, Okla., to Mullinville, Kan.

Status: Pending FPC approval.

Completion: November 1, 1958.

Project: 169 miles of 20-in. from Farmington, Minn., to Superior, Wis.

Status: Pending FPC approval.

Project: 23 miles of 24-in. main line loops in Nebraska.

Status: Pending FPC approval.

Project: 43 miles of 20-in. main line loops in Kansas, Nebraska, and Iowa.

Status: Pending FPC approval.

Project: 44 miles of 16-in. in Duluth-Superior area.

Status: Pending FPC approval.

Project: 1,100 miles of 26-in. from Montana border to Minneapolis, Minn. (See Northern Natural Gas Co. in Canadian Natural Gas Pipeline section).

Status: Planned.

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Project: 1,090 miles of 2 to 16-in. branch lines in Minnesota, Iowa, South Dakota, Nebraska, and Wisconsin.
Status: Pending FPC approval.
Project: 57 miles of 30-in. main line loops in Nebraska and Kansas.
Status: Pending FPC approval.

• **Northern Utilities Co.**
Project: 35 miles of 16-in. in Fremont-Natrona County, Wyoming, area; 8 miles of 12-in. around Casper; 6 miles of 8-in. from Sand Draw gas field to Beaver Creek field; 12 miles of 6-in. from Beaver Creek field to the system servicing the Riverton-Lander area.
Status: Planned.

• **Offshore Gathering Corp.**
Project: 364 miles in Gulf of Mexico off Louisiana: 60 miles of 24-in., 70 miles of 26-in., 234 miles of 30-in. (Dual line.)
Status: Application pending with FPC.

• **Ohio Fuel Gas Co.**
Project: 15 miles of 12-in. from Line H, Crawford Station to Zanesville, Ohio.
Status: Planned.
Completion: September 1, 1958.
Project: 3 miles of 20-in. from Line D-357 to near Marion, Ohio.
Status: Planned.
Completion: August 30, 1958.
Project: 2 miles of 12-in. from Line Z to near Troy, Ohio.
Status: Planned.
Completion: September 15, 1958.
Project: 10 miles of 8-in. from Line O-1463 to near St. Clarisville, Ohio.
Status: Planned.
Completion: October 5, 1958.
Project: 4 miles of 20-in. from Line A-97 to near Dayton, Ohio.
Status: Planned.
Completiton: October 2, 1958.
Project: 7 miles of 18-in. from line Z-50 to near Dayton, Ohio.
Status: Planned.
Completion: July 1, 1958.
Project: 13 miles of 4 to 20-in. from Medina storage to near Medina, Ohio.
Status: Planned. Filed application January 16, 1958.
Completion: July 25, 1958.
Project: 15 miles of 12-in. from Line L-400 at Shreve, Ohio, to Minerva, Ohio.
Status: Planned.
Completion: August 5, 1958.
Project: 4 miles of 8-in. from Line Z-207 to near Bellefontaine, Ohio.
Status: Planned.
Completion: July 20, 1958.
Project: 4 miles of 20-in. from Line L-2542 to near Oberlin, Ohio.
Status: Planned.
Completion: August 12, 1958.

• **Oklahoma Missouri Gas Transmission Co.,** Liberty Bank Building, Oklahoma City.
Project: 500 miles of 24-in. from Central Oklahoma to St. Louis.
Status: Proposed.

• **Pacific Gas & Electric Co.**
Project: 5 miles of 16-in., 160 miles of 12-in., 8 miles of 8-in. from Corning to Eureka, Calif.
Status: Under way.
Contractor: **Engineers Limited Pipeline Co. and Alex Robertson Co.**
Completion: June 1958.

• **Pacific Lighting Gas Supply Co.**
Project: 83 miles of 34-in. from North Coles Levee to Newhall, Calif.
Status: Under way.
Contractor: **Engineers Limited Pipeline Co.**
Completion: July 1, 1958.
Project: 128 miles of 34-in. from Topock to Newberry, Calif.
Status: Plans to file for FPC permit.
Completion: November 1, 1959.

• **Pacific Northwest Pipeline Corp.**
Project: 40-mile line from Ute Trail gas fields in northeastern Utah to its main line in western Colorado.
Status: Planned to start spring 1958.
Project: 51 miles of 30-in. from main line to Big Piney field, Wyoming, looping present 16-in. lateral.
Status: Pending FPC approval.

• **Panhandle Eastern Pipe Line Co.**
Project: 95 miles of 4-in., 45 miles of 6-in., 38 miles of 8-in., 3 miles of 10-in., and 12 miles of 12-in. gathering lines in Kansas, Oklahoma, and Texas.
Status: Under way.
Contractor: **Hall Construction Co.**
Completion: December 31, 1958.
Project: 33 miles of 16-in. from Muncie, Ind., to Hollansburg, Ohio.
Status: To start July 1, 1958.
Contractor: **O. R. Burden Construction Corp.**
Completion: September 1, 1958.

• **Pennsylvania Gas Co.**
Project: 23 miles of 10-in. in Erie County Pa., 15 miles of 8-in. in Warren and Chautauqua counties, Pa., 30 miles of branch lines, several small distribution lines.
Status: Has FPC permit.

• **Peoples Natural Gas Co.**
Project: 20 miles of 20-in. from Derry to Morrellville, Pa.
Status: Planned.
Completion: August 1958.
Project: 8 miles of 10-in. from Altoona to Tyrone, Pa.
Status: Under way.
Contractor: **Reese Construction Co.**
Completion: August 1958.
Project: 4 miles of 12-in. from Elders Ridge to Clarksburg, Pa.


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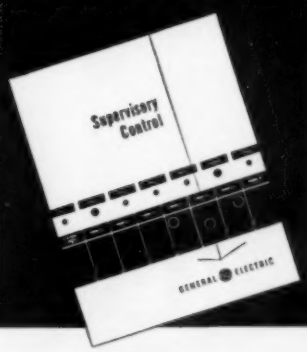


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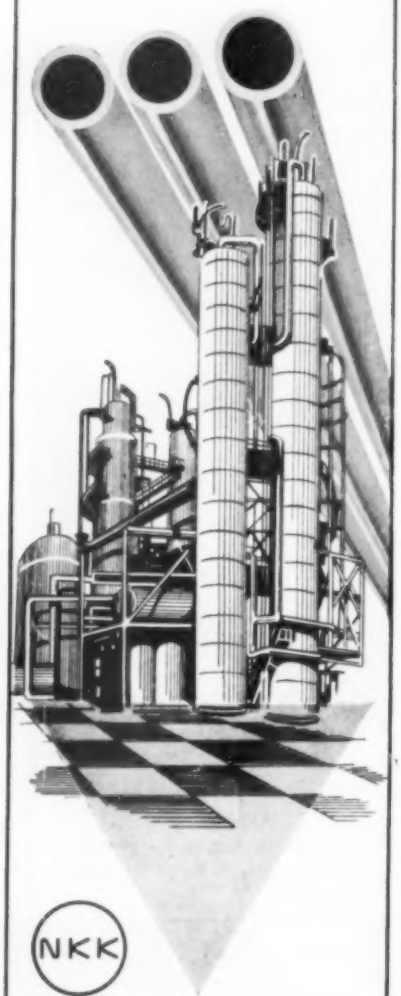

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## PIPELINE CONSTRUCTION

Status: Planned.
Completion: July 1958.
Project: 6 miles of 12-in. from Leechburg to New Kinsington, Pa.
Status: Planned.
Completion: July 1958.
Project: 7 miles of 12-in. from Gibsonia to Mars, Pa.
Status: Under way.
Contractor: **Reason Construction Co.**
Completion: July 1958.
Project: 3 miles of 12-in. from Elizabeth to Webster Pool, Pa.
Status: Planned.
Completion: August 1958.
Project: 17 miles of 10-in. from Laurel Ridge, Pa., south.
Status: Planned.
Completion: August 1958.
Project: 17 miles of 24-in. from McKeesport, Pa., south.
Status: Planned.
Completion: September 1958.

• **Phillips Petroleum Co.**
Project: 25 miles of 6 through 20-in. in South Eunice, N. M., area.
Status: Planned.
Project: 52 miles of 4 through 20-in. in Gaines County, Texas.
Status: Planned.
Project: 10 miles of 3 through 20-in. in Hutchinson County, Texas.
Status: Under way.
Contractor: **H. A. McGinnis.**
Completion: December 31, 1958.

• **Piedmont Gas Co.**
Project: 78 miles of 2 to 8-in. extension off Trancontinental in North Carolina to serve Gaston, Lincoln, Catawba, Caldwell, and Burke counties.
Status: Has FPC approval.

• **Pioneer Gathering System, Inc.**
Project: Gathering lines at Texas fields: 7 miles of 4-in. in Buckhorn field; 2 miles of 6-in., 1 mile of 4-in., and 2 miles of 8-in. in Vinegarone field; 2 miles of 3-in. in Mt. Ketchum field; 4 miles of 3-in., 1 mile of 2-in., and 16 miles of 4-in. in Tilleny field; 7 miles of 2-in. in Mertyon field.
Status: Plans to file for FPC permit.
Completion: November 1, 1958.

• **Signal Oil & Gas Co.**
Project: Considering expansion of gathering system for its sulfur-extraction plant at Tioga, N. D., into the developing oil area near the Canadian border in Burke County.
Status: Decision expected spring 1958.

• **Southern California Gas Co.** and **Southern Counties Gas Co.**
Project: 18 miles of 30-in. from near Newhall, Calif. to Burbank Boulevard and Yarmouth Avenue in Los Angeles.
Status: Planned.
Completion: December 1958.

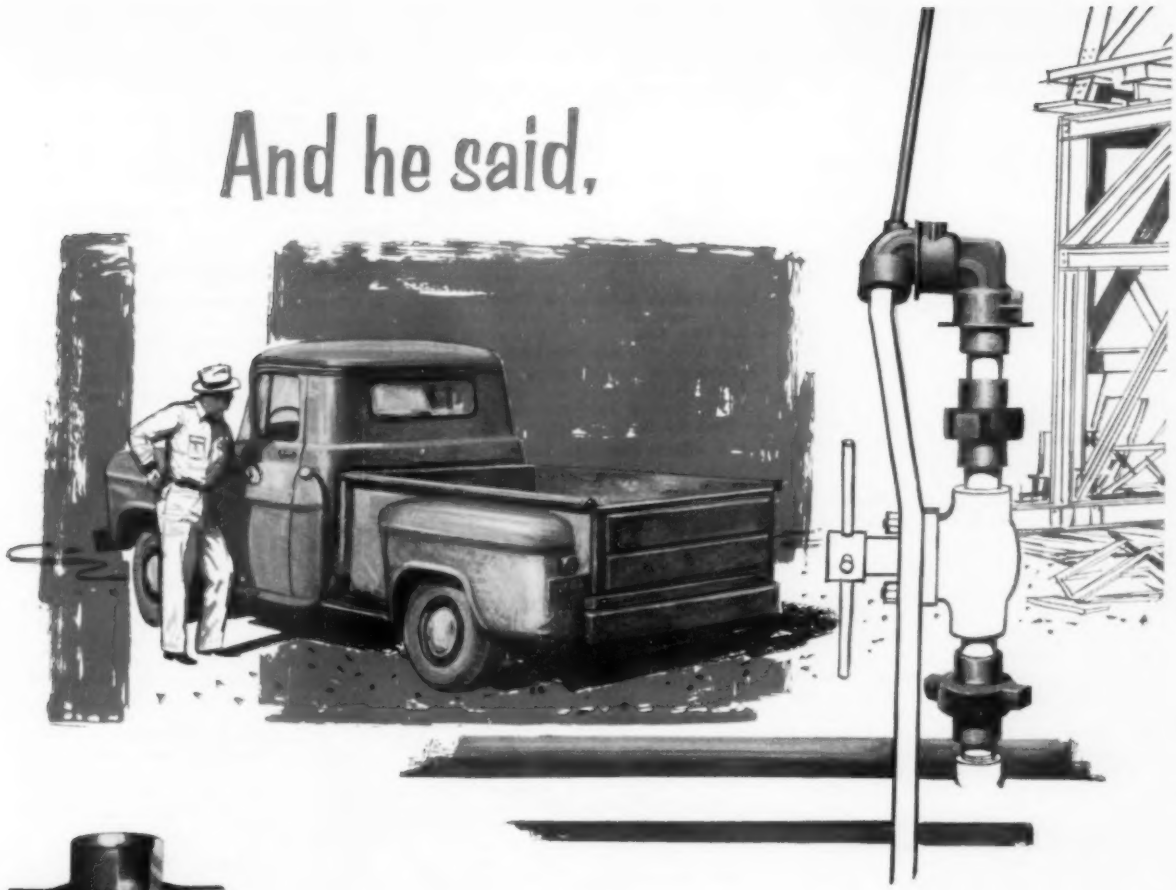
• **Southern Natural Gas Co.**
Project: Supply lines in South Louisiana: 4 miles of 16-in. Bayou Long field lateral; 7 miles of 16-in. Little Bayou Pigeon lateral; 4 miles of 6-in. Mystic Bayou field lateral; 2 miles of 6-in. East Bayou Pigeon lateral.
Status: Planned. Pending FPC approval.
Project: 7 miles of 24-in. from Gwinville to Pickens, Miss.
Status: Planned. Pending FPC approval.
Project: 13 miles of 10-in. Tanting field lateral in South Louisiana.
Status: Planned. Pending FPC approval.
Project: 3 miles of 8-in. Dexter field lateral in Mississippi.
Status: Planned. Pending FPC approval.
Project: Supply lines in South Louisiana: 46 miles of 20-in. from White Castle to South Section 28 field; 7 miles of 10-in. Bayou Boullion field lateral; 11 miles of 8-in. East Happytown field lateral; 8 miles of 10-in. and 11 miles of 8-in. Loisel field lateral; 17 miles of 20-in. Lake Washington field lateral; 22 miles of 12-in. West Delta Block 30 lateral; 4 miles of 8-in. Bayou Long field lateral; 6 miles of 4-in. Bayou Villars field lateral; 12 miles of 6-in. Marrero field lateral; 6 miles of 6-in. South Lake Long field lateral; 1 mile of 4-in. Tigers Ridge field lateral; 35 miles of 16-in. Montegut field lateral; 13 miles of 16-in. Barataria Line loop; 69 miles of 24-in. from Toca to Franklinton.
Status: Planned. Pending FPC approval.
Project: 45 miles of 4 to 12-in. Black Bay fields gathering system, Plaquemines Parish, Louisiana.
Status: Under way.
Contractor: **Houston Contracting Co.**, A. J. Slovak, supt., office at Chalmette.
Completion: May 1, 1958.
Project: 67 miles of 24-in. from Gwinville to Enterprise, Miss.; 71 miles of 24-in. from Enterprise to Gallion, Ala.; 83 miles of 24-in. from Gallion to Elmore, Ala.; 43 miles of 20-in. and 46 miles of 24-in. from Elmore to Ellerslie, Ga.; 69 miles of 20-in. from Ellerslie to Ocmulgee, Ga.; 79 miles of 16-in. from Ocmulgee to Wrans, Ga.; 8 miles of 6-in. Vicksburg, Miss., loop line; 5 miles of 12-in. Amory, Miss., loop line; 9 miles of 8-in. Calera, Ark., loop line; 23 miles of 14-in. Rome, Ga., loop line; 9 miles of 8-in. at LaGrange, Ga.; 62 miles of 14-in. from Ocmulgee, Ga. to Atlanta, Ga.
Status: Planned. Pending FPC approval.
Project: Facilities to attach additional gas supplies in South Louisiana: 6 miles of 8-in. from Ship Shoals Block 28 to Block 32; 29 miles of 16-in. from Ship Shoals Block 28 to Atchafalaya Bay; 15 miles of 16-in. from north shore Atchafalaya Bay to Patterson; 6 miles of 16-in. from Patterson to Duck Lake; 8 miles of 6-in. Bayou Felice lateral; 1 mile of 4-in. Triumph field lateral; 2 miles of 8-in. Coffee Bay field lateral.
Status: Planned for 1958-1959.
Project: Facilities to attach additional gas supplies in Mississippi: 8 miles of 8-in. Hub field lateral; 40 miles of 14-in. and 40 miles of 16-in. from Cranfield to Gwinville.
Status: Planned for 1958-1959.
Project: Gathering system loops in Louisiana: 42 miles of 20-in. from White Castle to Franklinton; 17 miles of 20-in. from Olga to Toca.
Status: Planned for 1958-1959.

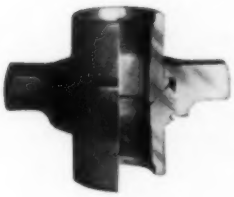
• **Tennessee Gas Transmission Co.**
Project: 556 miles of 30-in. from Mississippi Delta area south of New Orleans to Portland, Tenn.
Status: Has temporary FPC approval.
Project: 76 miles of 24-in. from Coudersport, Pa., to Hamburg, N. Y.
Status: Has temporary FPC approval.
Project: 163 miles of 30-in. and 101 miles of 26-in. from Portland, Tenn., to near Lancaster, Ky.; from Winchester, Ky., to Morehead, Ky.; from Catlettsburg, Ky., toward Broad Run, W. Va.; from New Wilmington, Pa., to Mercer, Pa.; and from Morehead, Ky., to Catlettsburg, Ky.
Status: Has Temporary FPC approval.

• **Tensas Gas Gathering Corp.**
Project: 37 miles of 2 to 8-in. from Rodney Field, Miss., westerly to connect with Olin Gas Transmission Co.'s line in Tensas Parish, Louisiana.
Status: Approval April 1958.

• **Texas Eastern Transmission Corp.**
Project: 17 miles of 8-in. and 3 miles of 6-in. from its 20-in. Baytown-Hankamer line to Alco-Mag field in Harris County, Texas.
Status: Has FPC approval.
Project: 22 miles of 14-in. from Rayne field to near Opelousas, La.
Status: Pending FPC approval.
Completion: November 1958.

# And he said,





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## PIPELINE CONSTRUCTION

• **Texas Illinois Natural Gas Pipeline Co.**
Project: 860 miles of 30-in. looping of present system.
Status: Planned.
Completion: 1960-1961.

• **Transcontinental Gas Pipe Line Corp.**
Project: 202 miles of 36-in. and 132 miles of 30-in. main line loop; 150 miles of 23-in. and 24 miles of 24-in. from Leidy storage field in Pa., to its trunk line to N.Y., 202 miles of 10 to 20-in. gathering lines in southeast La.; 48 miles of 10 to 20-in. to tap gas off Tex.
Status: Pending FPC approval.
Contractor: **Bechtel Corp.** has the 150 miles of 23-in. to connect storage in Pa.
Project: 57 miles of 36-in. main line loop.
Status: Pending FPC approval. Planned for 1959.
Project: 87 miles of 24-in. laterals, plus small gathering lines connecting seven Louisiana fields with the New Orleans area.
Status: Pending FPC approval.

• **Transwestern Pipe Line Co.** (Warren Petroleum, Monterey Oil Co.; J. R. Butler).
Project: 635 miles of 24-in. from Perryton and Fort Stockton, Tex., to Roswell, N. M., and 670 miles of 30-in. from Roswell to Toprock, Ariz.
Status: Pending FPC approval.

• **United Gas Corp.**
Project: 17 miles of 12-in. and 1 mile of 6, 8-in. from Lirette-Mobile line in Jackson County, south to Bayou Casottee industrial area east of Pascagoula, Miss.
Status: Under way.
Contractor: **Houston Contracting Co.**, L. A. Young, supt., office at Moss Point, Miss.
Project: 117 miles of 30-in. loop from southeast Louisiana, to Mobile, Ala.
Status: Approved.
Project: 12 miles of 16-in. and 16 miles of 8-in. on Gulf Coast of Louisiana, in Terrebone Parish.
Status: Under way.
Contractor: **Brown & Root, Inc.**
Project: 3 miles of 8-in. from Lake Hatch field to Lirette-Napoleonville line in Terrebonne Parish, Louisiana.
Status: Planned. Approved.
Project: 4 miles of 6-in. from Southeast Houma field to North Houma field line in Terrebonne Parish, Louisiana.
Status: Planned. Approved.
Project: 3 miles of 6-in. from Lake Fields field to Lake Long-St. Rose line in Terrebonne Parish, Louisiana.
Status: Under way.
Contractor: **J. Ray McDermott & Co., Inc.**, of New Orleans.
Project: 4 miles of 12-in. from Fairbanks-Rosslyn-North Houston field facilities to near Houston.
Status: Planned.
Project: 5 miles of 20-in. from Refugio-Houston line to Smither Lake.
Status: Under way.
Contractor: **Fowler-Tatom** of Cotton Valley, La.

• **Western Slope Gas Co.**
Project: 7 miles of 4-in. gathering lateral in northwestern Colorado.
Status: Planned.
Completion: July 1, 1958.

### Canadian Crude-Oil Pipelines

• **Act Oils, Ltd.**
Project: A 450-mile line from the Peace River region of northern B. C. to tidewater at Bella Coola, B. C.
Status: Request has been made for permit from the B. C. government.

• **B-A Alberta Pipe Line, Ltd.**
Project: 35 miles of 8-in. to connect Drumheller field, Alberta, with existing lines running to Edmonton.
Status: Pending approval.

• **Bituminous Oil Pipeline Co.** (Royalite Oil Co. and Can-Amera Oilsands Development, Ltd.)
Project: 250-mile line from Athabasca oil sands in northeastern Alta., to Edmonton.
Status: Long-range plans.
Completion: 1960.

• **East Coast Transmission Co.** (Pacific Petroleums, Ltd., Home Oil, Ltd., Canadian Homestead Oil, Ltd., Merrill Petroleums, Ltd.)
Project: Line from Alberta to Montreal.
Status: Proposed.

• **Interprovincial Pipe Line Co.**
Project: 82 miles of 24-in. loops in Alta. and Sask.
Status: Under way.
Contractor: **Piggott Construction, Ltd.**, Edmonton, Alta.
Completion: September 1958.

• **Westcoast Transmission Co., Ltd.**
Project: Line to parallel its 650-mile, 30-in. gas line from Peace River to Vancouver, B. C.
Status: Under study.

• **Westspur Pipe Line Co.**
Project: 20 miles of 12-in. from Alida in southeastern Saskatchewan, to the Carnduff-Glen Ewen area to tap Cantal, Hastings, Florence, Carnduff, and Glen-Ewen fields; 34 miles of 4, 6, 8-in. gathering lines.
Status: Has requested permit from Board of Transport Commissioners.
Contractor: **Majestic Contractors, Ltd.**, Jeff Minter, supt., office in Estevan, Sask.
Completion: No date set.

### Canadian Products Pipelines

• **Hydrocarbons Pipeline Co.**
Project: 800 miles of 6 and 8-in. L.P.G. line from near Edmonton, Alta., to Fort William, Ont.
Status: Has permit from Parliament of Canada. Seeking approval by Federal Board of Transport Commissioners and the Alberta Petroleum and Natural Gas Conservation Board.
Construction consultants: **Dutton-Williams Brothers, Ltd.**, and **A. D. Little Co.**

### Canadian Natural-Gas Pipelines

• **Alberta Gas Trunk Line Co., Ltd.**
Project: 145 miles of 24-in. from Pincher Creek to Princess, Alta., including 11 major canal crossings.
Status: Under way.
Contractor: **Piggott Construction, Ltd.**, Calgary.
Completion: September 1, 1958.
Project: 24 miles of 26-in. from Steveville to Princess, Alta.
Status: Planned.
Project: 50 miles of 34-in. from Princess to Cavendish, Alta.
Status: Planned.
Project: 24-in. crossings of Old Man and Bow rivers, and 26-in. crossing of Red Deer River.
Status: Under way.
Contractor: **Fulton Banister, Ltd.**
Completion: May 1, 1958.
Project: 11 miles of 6-in. at Sibbald field and 5 miles of 6-in. at Atlee Buffalo, Alta.
Status: Planned.
Completion: September 1, 1958.

• **Alberta & Southern Transmission Co., Ltd.**
Project: 1,300 miles of 36-in. from Alberta to San Francisco area plus 47 miles of gathering lines.
Status: Planned
Completion: 1960.

• **Canadian Western Natural Gas Co., Ltd.**
Project: 58 miles of 16-in. from Carbon field to Calgary, Alta.
Status: Proposed. Pending approval of Alberta Oil and Gas Conservation Board.

• **Northern Natural Gas Co.**
Project: 73 miles of 20-in. from Savanna Creek to Pincher Creek, Alta.
Status: Planned.
Project: 32 miles of 24-in. from Pincher Creek, Alta., to Montana border to tie in with planned U. S. line on to Minneapolis, Minn.
Status: Planned.

• **Northern Ontario Gas Transmission Co.**
Project 90 miles of 16-in. from North Bay to Sudbury, Ont.
Status: Planned to start in May.

• **Northern Ontario Pipe Line Crown Corp.**


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## PIPELINE CONSTRUCTION

Project: 675 miles of 30-in. from the Ontario-Manitoba border to near Kapuskasing, Ont. (part of the 2,250-mile Trans-Canada line; will be leased to Trans-Canada Pipe Line Co. with option to buy). 360 miles from Port Arthur to Kapuskasing remains to be laid in 1958.

Status: Under way.

Contractor: **Nelen, Ltd.; Majestic Contractors, Ltd.; B. C. River Construction, Ltd.,** has 91 miles from Longlac to Hurst, E. L. Maggard, supt., office at Longlac, to complete October 1; **Mannix, Ltd.,** has 92 miles from 35 miles west of Hearst, Ont., to Kapuskasing, Odis Hare, supt., office at Hearst; **Morrison Shivers, Ltd.**

Completion: November 1958.

• **Northwestern Utilities, Ltd.**

Project: 4 miles of 16-in., 4 miles of 12-in., 4 miles of 10-in., 5 miles of 8-in., 29 miles of 6-in., and 3 miles of 4-in. Pembina field gathering system, including an 8-in. crossing of Pembina River, and a 16-in. crossing of North Saskatchewan River.

Status: Under way.

Contractor: **Mannix Co., Ltd.,** S. Steffen, supt., office at Drayton Valley.

Completion: September 30, 1958.

Project: 45 miles of 16-in. from Pembina field to tie in with existing 26-mile, 16-in. oil line terminating at Edmonton, Alta., which Northwestern is buying from Pembina Pipeline, Ltd., and which will be converted to gas.

Status: Under way.

Contractor: **Mannix Co., Ltd.**

Completion: September 30, 1958.

• **Saskatchewan Power Corp.**

Project: 5 miles of 16-in., 18 miles of 10-in., 4 miles of 8-in., 13 miles of 4-in., and 13 miles of 3-in. Many Islands gathering system in Alta.; 6 miles of 8-in., 4 miles of 6-in., 3 miles of 4-in., and 13 miles of 3-in. Hatton gathering system in Sask.; 38 miles of 12-in. extension of Steelman-Regina line; 124 miles of 10-in. extension of Regina-Moose Jaw line.

Status: Planned. Bids closed April 1, 1958.

Completion: September 30, 1958.

• **Trans-Canada Pipe Lines, Ltd.**

Project: 491 miles of 30-in. from Kapuskasing to Toronto.

Contractors: Starting at Kapuskasing and going toward Toronto, **Grayco Contractors, Inc.,** has 82 miles; **Majestic Contractors, Ltd.,** has 83 miles; **Dutton-Williams Brothers, Ltd.,** has 57 miles; **Canadian Bechtel, Ltd.,** has 47 miles from Rib Lake to Tilden Lake, H. F. (Hank) Mogg, general supt., office at Timagami; **Morrison-Shivers, Ltd.,** has 62 miles; **H. C. Price Co.** and **Poole Construction Co.** has 63 miles; **Oklahoma Pipe Line Constructors** has 92 miles.

Completion: October 1, 1958.

• **Van Tor Oils & Exploration Co.,** Vancouver.

Project: Line from B. C. mainland to Vancouver Island.

Status: Proposed.

Completion: 1960.

• **Westcoast Transmission Co., Ltd.**

Project: 110 miles of 30-in. and 176 miles of 20-in. from East Calgary and Savanna Creek fields to Kingsgate on B.C.-Idaho border.

Status: Planned.

Completion: November 1, 1958.

Project: Looping of present system to double capacity.

Status: Planned.

Project: 80 miles of 8, 10, 12, 18, 20-in. extension of gathering system along Alaska Highway in Northeastern B. C.

Status: Under way.

Contractor: **Dutton-Williams Brothers, Ltd.,** Doyle Cook, asst. supt., office at Dawson Creek.

Completion: August 1958.

### Foreign Crude-Oil Pipelines

• **Arabian American Oil Co.**

Project: 9 miles of 32-in. loop from Abqaiq toward Shedgum.

Status: Planned.

Completion: 1960.

Project: 17 miles of 32-in. extension of loop from Abqaiq toward Shedgum.

Status: Planned.

Completion: 1961.

Project: 9 miles of 30-in. extension of loop from Abqaiq toward Shedgum.

Status: Planned.

Completion: 1960.

Project: 12 miles of 30-in. extension of loop from Abqaiq toward Shedgum.

Status: Planned.

Completion: 1961.

Project: 54 miles of 30-in. loop of Safaniya-Ras Tanura line.

Status: Planned.

Completion: January 1959.

Project: 63 miles of 30 and 32-in. from Khursaniyah to Ras Tanura.

Status: Planned.

Completion: January 1960.

• **Assam Oil Co.**

Project: 600 miles of 20-in. from Nahorkatiya field in Upper Assam to Barauni, India, to connect with Burmah Oil Co.'s proposed 250-mile line from Barauni to Calcutta.

Status: Survey of possible routes under way.

Contractor: **Pipe Line Engineering Co.** is making survey.

• **Bolivia-Paraguay.**

Project: 500 miles of 6-in. from Southeast Bolivia to a proposed refinery on Paraguay River, and later to Asuncion.

Status: Planned .

Contractor: **Five Lilles,** a French Combine.

• **Burmah Oil Co., Ltd.**

Project: 250 miles of 20-in. from Barauni to Calcutta, India, extending Assam Oil Co.'s proposed line.

Status: Survey under way.

Contractor: **Collins Construction Co.** is surveying locations for some 40 river crossings.

• **Caltex**

Project: 30 miles of 30-in. from Duri field in Sumatra to Dumai where a deepwater terminal will be built. Line will be extended 35 miles to Minas field later.

Status: Under way.

Contractor: **Bechtel Corp.**

Completion: 1958.

• **Cia. Shell de Venezuela**

Project: 34 miles of 16-in. from Boscan to site of a planned terminal at Puerto Miranda, Venezuela.

Status: Under way.

Contractor: **Williams Brothers Sudamericano, Ltd.**

Project: 70 miles of 30 and 34-in. heated line from Bachaquero to Puerto Miranda, and an unheated 31-in. parallel to the section from Cabimas to Puerto Miranda.

Status: Planned.

Contractor: **Williams Brothers Sudamericano, Ltd.**

• **Colombian Petroleum Co.**

Project: 42 miles of 6-in. from Tibu field to Rio de Oro in Colombia.

Status: Under way.

• **C.R.E.P.S., Societe Nationale de Recherche et d'Exploitation des Petroles en Algerie (SN Repal), and Cie. Francaise des Petroles Algerie**

Project: 450 miles of 16-in. from Edjele field in southeastern Algeria to a Mediterranean port on the Libyan coast.

Status: Pipe has been ordered.

• **Creole Petroleum Corp.**

Project: 90 miles of 30-in. and 4 miles of 24-in. from Temblador field to Caripito in Venezuela.

Status:Under way.

Contractor: **Pipe Line Engineering Co.** and **Oklahoma Pipe Line Constructors,** R. J. O'Connell, supt., office at Maturin.

Completion: June 1958.

• **Elburz Oil Corp.**

Project: 1,000 miles of 38-in. to move Qum crude to the Mediterranean.

Status: Planned.

• **Iranian Oil Participants, Ltd.**

Project: 30 miles of 20-in. and 22 miles of 16-in. looping of Agha Jari to Bandar Mashur line.

Status: Planned.

Project: 50 miles of 26, 28-in. from Gach Saran field to new terminal at Kharg Island in the Persian Gulf.

Status: Planned.

Contractor: A joint venture of **Raymond Concrete Pile Co.** and **Williams Brothers Co.** of Tulsa; **Richard Costain, Ltd.,** and **John Brown, Ltd.,** of Britain; **Werkspoor & Bredoro** of The Netherlands.

• **Iraq Petroleum Co.**

Project: About 600 miles of up to 40-in. from Kirkuk field through Iraq to Turkish port of Iskenderun on the Mediterranean.

Status: Proposed. Survey completed.

• **Israel Government**

Project: 90 miles of 16-in. running northward along the Mediterranean Coast from Asdod Yam.

Status: Planned.

Completion: Mid-1958.

• **Kuwait Oil Co., Ltd.**

Project: 61 miles of 30-in. from Raudhatain area to Ahmadi.

Status: Under way.

Completion: June 1959.

Project: 14 miles of 34, 36-in. No. 5 Transit Line, including loop line.

Status: Under way.

Completiton: August 1958.

Project: 7 miles of 38, 40-in. and 2 miles of 30-in. No. 10 Gravity Line, including loop line, from North Ahmadi Tank Farm to North Pier.

Status: Planned.

Completion: May 1958.

Project: 7 miles of 38, 40-in. No. 11 Gravity Line from North Ahmadi Tank Farm to North Pier.

Status: Planned.

Completion: December 1958.

Project: 7 miles of 38, 40-in. No. 12 Gravity Line.

Status: Planned.

Completion: April 1959.

• **Mene Grande Oil Co.**

Project: 100 miles of 30-in. from Oficina to Puerto La Cruz, Venezuela.

Status: Under way.

Contractor: **Williams Brothers.**

Completion: May 1, 1958.

Project: 45 miles of 24-in. from Oficina to Melones, Venezuela.

Status: Under way.

Contractor: **Chicago Bridge & Iron Co.**

Completion: May 5, 1958.

• **Middle East Pipeline**

Project: 1,500 miles of 38 and 40-in. line from Persian Gulf to Mediterranean at Iskenderun, Turkey.

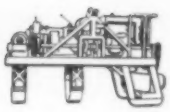
Status: Proposed.

• **North-West Oil Pipeline Co.** (newly formed by six West German refiners, headed by affiliates of Standard Oil Co. (N.J.), and British Petroleum Co., Ltd.)

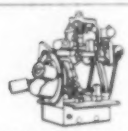
Project: 230 miles of 28-in. from refining centers in the industrial Ruhr area of West Germany to Wilhelmshaven.

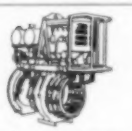
Status: Under way.

stationary coating & wrapping machine

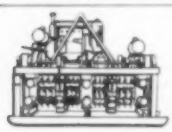

road boring machine

Cinch hydraulic pipe bending machine


line traveling coating & wrapping machine

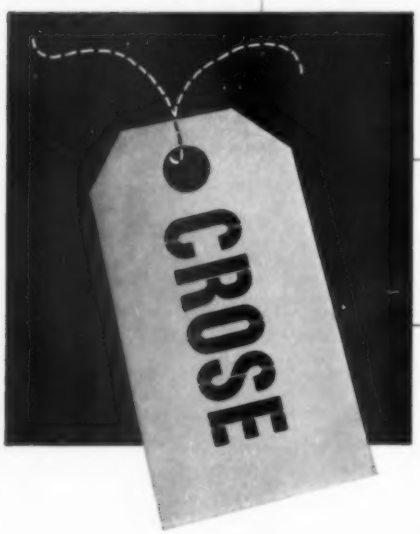

line traveling cleaning & priming machine

pipeline cradles

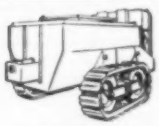

stationary cleaning & priming machine

pipe cutting & beveling machine

internal line up clamp



ditch padder


pipeline kettles

## THIS NAME ASSURES QUALITY PIPELINE EQUIPMENT

At Crose the word "quality" means two basic things. First, that the equipment has been engineered and designed to perform under the toughest conditions. Secondly, that the equipment will deliver long-term performance with maximum efficiency and lowest maintenance costs. That's the kind of quality you get in Crose equipment — and it's available through many strategic supply points.

New York, N. Y.
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*Denver, Colorado
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*Houston, Texas
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*Newark, N. J.
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*Edmonton, Alberta
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*Warehouses in 5 locations

The Crose MANUFACTURING COMPANY, INC.
2715 Dawson Road • Tulsa, Oklahoma • Ph. MAdison 6-2171


## PIPELINE CONSTRUCTION

Contractor: **W. M. Lyles** in joint venture with two German steel firms.
Completion: November 1958.

- **Petroleo Brasileiro S.A. (Brazil)**

Project: 40 miles of 12-in. from Catu to Madre de Deus in Bahia.
Status: Under way.
Contractor: **Techint, Inc.**

- **Royal Dutch-Shell**

Project: 700-mile line across Europe from the Mediterranean to the North Sea, running through Eastern France, Luxembourg, West Germany, Netherlands, and Belgium. Main trunk to be 30-in.
Status: Company is considering project together with several other companies.

- **SOPEG** (Cie. Francaise de Petrole (Algerie) and Ste. Nationale de Recherche et d'Exploitation des Petroles en Algerie)

Project: 300 miles of 24-in. from Hassi Messaoud field in the Algerian Desert to Bougie on the Mediterranean Coast.
Status: Under way.
Contractor: **Entrepose Co.** jointly with **Ste. Parisienne pour Industrie Electrique.**
Completion: 1959.

- **Union of Soviet Socialist Republic**

Project: 2,300-mile Trans-Siberian crude-products line from Ufa Tuimaza fields in Bashkiria to Irkutsk near Lake Balkal.

- **Yacimientos Petroliferos Fiscales** (Argentina)

Project: 932 miles of 12-in. from Campo Duran to San Lorenzo.
Status: Planned.
Contractor: **TIPSA** (Fish Engineering Corp., Fish Northwest Constructors, Inc., Clark Brothers, North American Utility, Construction International Co.)
Status: Planned.
Completion: Mid-1960.
Project: 390 miles of 14-in. from fields in Neuquen Province, Argentina, to Bahia Blanca on the coast.
Status: Bids requested.
Project: 625 miles of 12-in. from Mendoza to San Lorenzo.
Status: Planned.

- **Yacimientos Petroliferos Fiscales Bolivianos**

Project: 174 miles of 10-in. and 44 miles of 8-in. from Sicasica, Bolivia, to Arica, Chile.
Status: Under way.
Contractor: **Williams Brothers Co.**
Completion: November 1, 1958.

### Foreign Products Pipelines

- **Empresa Nacional de Petroles Government of Chile** and **Cia de Petroles de-Chile (Copec), et al.**

Project: 75 miles of 10-in. from Chile's coastal refinery at Concon to Santiago.
Status: Planned.
Contractor: **Williams Brothers.**
Completion: 1958.

- **National Iranian Oil Co.**

Project: 90 miles of 12-in. from Abadan to Ahwaz, Iran.
Status: Under way.
Contractor: **Entrepose Co.,** Paris.
Completion: Summer 1958.
Project: 120 miles of 6-in. northward extension of its Abadan-Teheran system.
Status: Planned.
Contractor: **B. & M. Construction Corp.,** Oklahoma City.

### Foreign Natural-Gas Pipelines

- **Attock Oil Co.**

Project: 60 miles of line from Dhulian field to Rawalpindi in West Pakistan.
Status: **Planned.**

(Continued on page 179)

A large diameter steel head takes form on one of Claymont's spinning machines—units that turn out heads up to 19 feet in diameter, in ferrous and non-ferrous metals. Integrated facilities make Claymont a reliable source of quality steel plate and plate products for industry.

*by d'Arazien*

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CF&I

**CHECK CLAYMONT FOR**—Alloy Steel Plates • Carbon Steel Plates • Stainless-Clad Steel Plates High Strength Low Alloy Steel Plates • CF&I Lectro-Clad Nickel Plated Steel Plates • Pressed and Spun Steel Heads • Manhole Fittings and Covers • Fabricated Steel Products Large Diameter Welded Steel Pipe

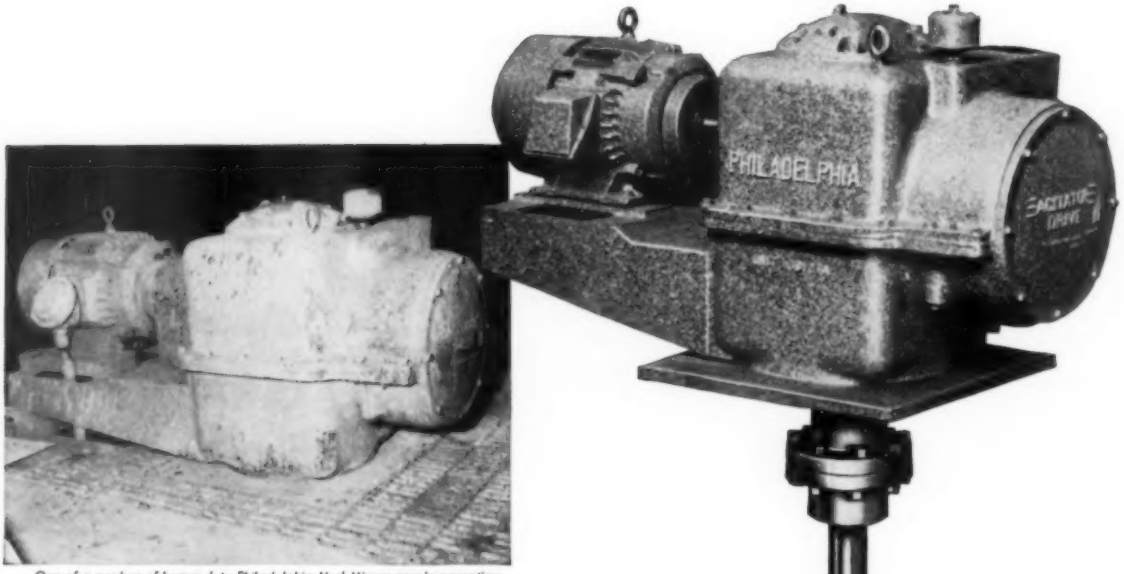
**PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION • THE COLORADO FUEL AND IRON CORPORATION**

Plant at Claymont, Delaware • Sales Offices in all Key Cities

5745

# PHILADELPHIA MUD MIXERS...

## more rugged–for more years of dependable service




One of a number of heavy duty Philadelphia Mud Mixers now in operation.

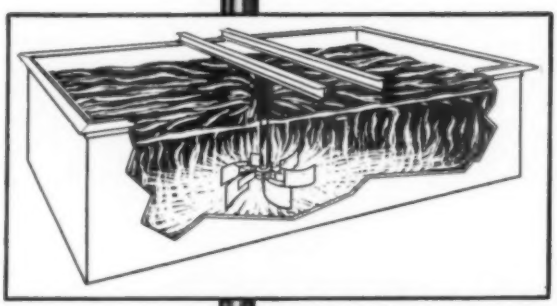
### For Suspension of Drilling Mud:

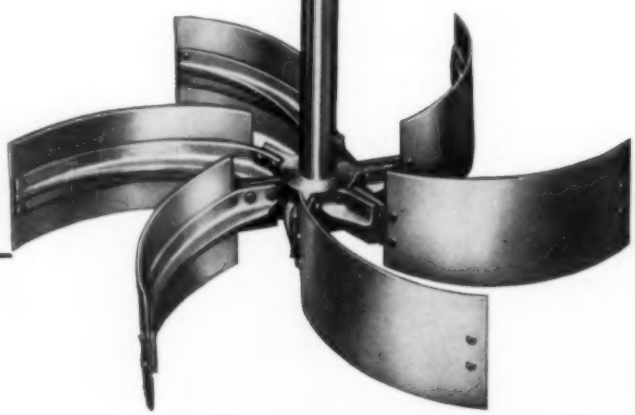
The turbine type mixer has become the accepted standard wherever holes are being drilled—doing the job with less horsepower, providing large dollar savings in pump maintenance costs. Philadelphia Mud Mixers, with higher torque capacity, have provided outstanding performance in drilling mud suspension.

### For Longest, Lowest Cost Mixer Service Under Severe Conditions:

Philadelphia Mixers and Mixer Drives have been recognized for outstanding durability for over 30 years. Each vital component in these big, rugged drives is supplied with the extra capacity that means added years of service. Every shaft in each drive is oversized to tolerate maximum shock loading encountered in severe service—then supported by big, high capacity roller bearings. Every design feature makes for more years of service, more cost savings to the user.

**GET THE FULL STORY ON PHILADELPHIA MIXERS. SEND FOR CATALOG A-27 TODAY.**





**New Philadelphia Mixer impeller design eliminates settling out... keeps mud uniform . . . mixes instantly.**

philadelphia mixers®

*PHILADELPHIA GEAR WORKS, INC.*

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Offices in all Principal Cities

INDUSTRIAL GEARS & SPEED REDUCERS
LIMITORQUE VALVE CONTROLS
FLUID MIXERS • FLEXIBLE COUPLINGS

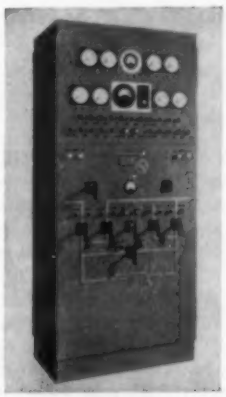
Virginia Gear & Machine Corp. • Lynchburg, Va.

# This week's SHOWCASE features . . .

## New dispersant for muds

. . . controls viscosity and gel strength. Called Tanflow, the drilling-mud dispersant was especially developed for control of viscosity, gel strength, and fluid loss. It's a free-flowing, noncaking powder compatible with all popular additives and mud-treating chemicals, and also an excellent stabilizer for oil-emulsion muds, according to the maker. The product is packaged in 50-lb. sacks. **Write or call: Rayonier, Inc., 52 Vanderbilt Avenue, New York 17, for details on Rayflo.**

●



## Compressor starting unit

. . . automatically sequences all valves. The new CSU-1 compressor-start unit will start and bring on line a compressor on receipt of a single actuation signal. Thus it permits semiautomatic operation of a compressor station from the control room.

The unit also displays instant indications of measurements and functions. Alarm operation and automatic shutdown occur when safe operating parameters are exceeded, or on failure of proper starting events. Appropriate warning signals are given simultaneously for transmission to the dispatch office.

Fire, explosion, or an explosive atmosphere cause shutdown of the entire station and transmission of an appropriate signal to the dispatch office. The start unit consists of two separate sections of heavy-gage aluminum. One section mounts above the other over a matching base platform. **Write or call: Southwestern Industrial Electronics Co., 2831 Post Oak Road, P. O. Box 13058 Houston 19, for details on compressor start unit.**

## Roll-paper adapter speeds work

The roll-paper adapter is for fast reproduction of logs with Thermo-Fax copying machines. The unit is particularly suited for making exact copies of original seismographic records varying in widths up to 14 in. and almost any length.

Except for insertion of the paper, copying is completely automatic. It takes place at the rate of 1 ft. every 4 seconds. Total copying time for a 7-ft. seismic record is 28 seconds. Records are ready for immediate use.

The continuous-roll adapter is used with the Thermo-Fax Fourteen copying machine. **Write or call: Dept. S8-66, Minnesota Mining and Mfg. Co., 900 Bush Street, St. Paul 6, Minn., for details on Thermo-Fax adapter.**

Send this **Showcase Coupon**

to the **Manufacturer** of the item in which you are interested. See name, address, and equipment name and/or model, in bold-face type at end of description.

NAME AND/OR MODEL NUMBER.....

.....

.....

Described in OIL AND GAS **JOURNAL** - Issue of April 28, 1958

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

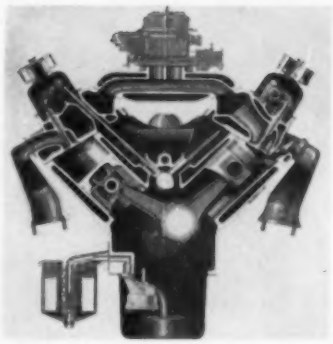
CITY.....STATE.....

DATE.....

## Engine comes in ten models

. . . to provide ratings from 30 to 260 hp. The engine shown here is one of three new Ford gasoline engines available. Also available is a new six-cylinder diesel. These four added to the line give a choice of 10 basic industrial engines with displacement ranging from 134 to 534 cu. in.

The new V-8 gasoline-engine models have displacements of 401, 477, and 534 cu. in., respectively. The new six-cylinder diesel has a displacement of 330 cu. in. The three gasoline engines feature high-turbulence, wedge-shaped combustion chambers; a new fuel-induction system; and a new full-pressure lubrication system. Compression ratio of all three gasolines is 7.5 to 1.



The new six-cylinder, diesel features: (1) a 12-volt electrical system for easy starting under extreme weather conditions, (2) replaceable "wet" cylinder sleeves, (3) overhead exhaust valves designed to rotate each time the valves open and close, and (4) four-way fuel injectors which disperse fuel evenly for efficient combustion. Compression ratio is 16 to 1. **Write or call: Ford Div., Ford Motor Co., P. O. Box 608, Dearborn, Mich., for details on industrial engines.**

●

THIS BLOWOUT PREVENTER IS
STRONG
SIMPLE
AND IT
REALLY
HOLDS PRESSURE!
DOUBLE-E
TYPE LP
BLOWOUT
PREVENTER
Prevents blowouts when pulling rods. Shuts in the well while replacing stuffing box rubbers. Flat faced rams seal against all diameters from 0 to 1½". No packing glands to leak. Available in all thread sizes. Get the Double-E Blowout Preventer through your local supply store!
EQUIPMENT ENGINEERS, Inc.
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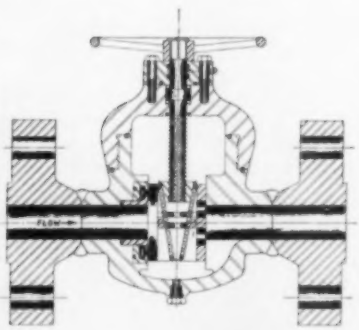


## Gate valve opens easy

. . . and seals right under pressures to 2,000 psi. The new Stream-Flo gate valve assures effective upstream sealing by use of a self-sealing gasket type of seal, the maker reports. It opens and closes easily under pressure as a result of roller-bearing wedge design.

As the valve wheel is opened, the wedge is lifted and allows the seat disks to retract, thus preventing drag across the seal face. The valve at present is designed for a 2,000 psi. working pressure. This can be extended to 10,000 psi. with the use of alloy steel. Maximum operating temperature of the valve is 350° F. **Write or call: Charles Wheatley Co., 414 South Detroit, Tulsa, for details on Stream-Flo gate valves.**

●

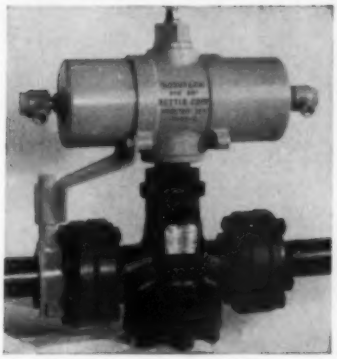
## Detector checks formation of bubbles

. . . at any location in fluid-flow system.

The detector consists of a sensing mechanism and controller composed of electrical circuits. It is useful in the control of fluid-flow valves and pumps. It has recorded 1/20-in. diameter bubbles in a 6-in. line. Detection signals can be transmitted to an oscilloscope or a telemetering transmitter. **Write or call: Garrett Corp., AiResearch Mfg. Div., 402 South Thirty-sixth Street, Phoenix, Ariz., for details on cavitation detector.**

SHOWCASE . . .

## New Equipment



### Actuator easily installed in the field

. . . to operate wrench-opened plug valves. Gas or liquid operated, the device is called the Robotarm valve actuator. A totally enclosed piston rack and gear assembly is used. It's fully submerged in an oil bath. Only a few minutes is needed to place the actuator over and adapt it to the average plug-valve stem.

A square recess is provided in the bottom of the rotating gear shaft to facilitate adapting the actuator to the average plug-valve stem. A square shank atop the shaft enables the unit to be hand-wrench operated. Adjustable stops are provided.

Standard models generate a torque output of 3,000 to 25,000 in.-lb. with 100 psi. operating pressure. **Write or call: Research Engineering Co., Drawer 9365, Houston, for details on new actuator.**

•

### Device transmits handwriting over wires

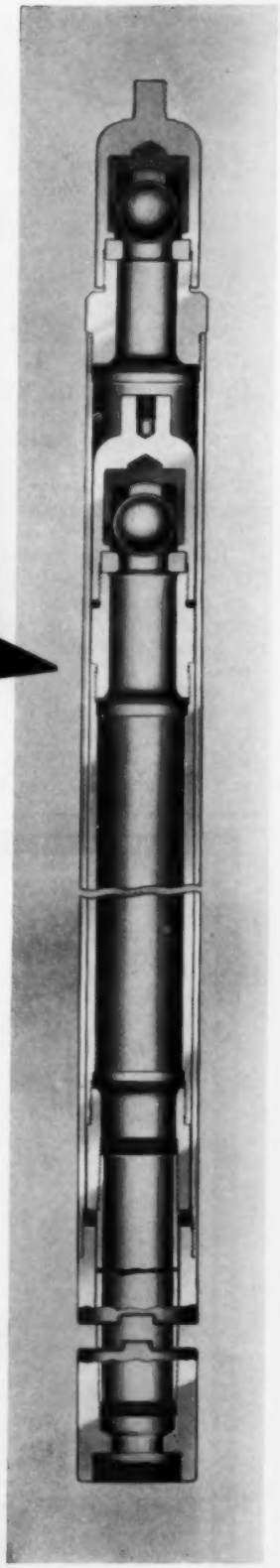
. . . permits transmission of maps, drawings.

Called Stenotron, the device transmits handwriting electronically from one point to another over telephone wires. It permits immediate transmission of hand-drawn maps, drawings, numerals, and normal-fast handwriting, with accuracy of 1/32 in.

Using an FM radio, the writer can be used from air-to-ground or office-to-vehicle transmission. A message is transmitted by writing with a ballpoint pen on continuously fed paper. As the transmitter pen is operated, a "slave" ballpoint pen at the receiving station writes the exact same message simultaneously. **Write or call: Autron Engineering, Inc., 2201 Park Drive, Los Angeles 26, for details on Stenotron.**


*Designed for Your Waterflood**

*WITH THIS PACIFIC INSERT ROD PLUNGER PUMP YOU GET VOLUME *plus*



**1** A precision insert rod pump of 4½" O.D. x 3¾" I.D. built to Pacific standards.

**2** A specifically designed pump for pumping large volumes of fluid efficiently **at any speed**—fast or slow—with a conventional pumping unit installation.

**3** A pump that will seat in a regular production casing packer and may be operated in 5" casing (or larger) thereby eliminating tubing.

**4** A pump ideally suited for pumping water supply wells in the range of 2000 to 3000 barrels of fluid per day for water flooding operations.

**5** A pump equipped with Pacific Pacilite chrome plungers and the latest design rubber lined cages for long trouble-free operation.

*Ask your Pacific field salesman for more details or write:*

**PACIFIC PUMPS, INC.**
A DIVISION OF DRESSER INDUSTRIES, INC.
HUNTINGTON PARK, CALIFORNIA
Mid-Continent Division:
1358 So. Sheridan Ave., Tulsa 12, Oklahoma
Pacific Pumps of Canada, Ltd.,
Edmonton, Alberta

PACIFIC®

DW-18

## Tester gives pipe thickness

. . . fast on pipe sizes from 2 to 12 in. o.d. Called the Penetron Model 4, it provides a handy tool for rapid inspection of process piping. The instrument employs a gamma ray detector and a radium source.

Radiation is transmitted through a chord of the pipe wall. The penetrating portion is monitored. The radiation intensity as seen by the detector is a function of the pipe-wall thickness.

Accuracy of the instrument is 0.3% of thickness, range is 0 to 1 in. Response time is 15 seconds, and total weight is 5½ lb. The device is battery-operated and completely transistorized. **Write or call: United Engineers, Inc., 824 East Sixth Street, Tulsa 20, for details on Penetron Model 4 tester.**

## Extinguisher uses dry chemicals

Improvements in chemicals, nozzles, and other equipment are credited with the high effectiveness of the fire extinguisher. Both the extinguisher and the chemical used have passed Underwriters Laboratories tests.

Especially well adapted to oil and gas fires, the unit is safe for electrical fires also because it is a nonconductor, the maker says.

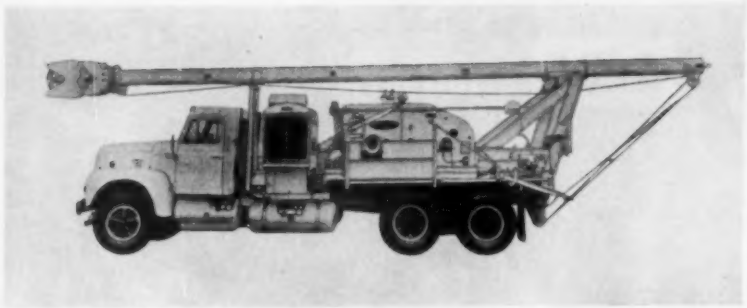
The chemical does not cake, freeze, or deteriorate. Its fire-killing gas is harmless to humans and animals, even in confined places. **Write or call: Fire King Corp., 501 Texas National Bank Building, Houston, for details on fire extinguisher.**

## Servicing rig racks doubles

. . . of pipe and folds to 35-ft. length for highway travel. The portable Cooper Skytop rig may be obtained four ways: (1) truck-engine powered, (2) truck-mounted with individual engine, (3) trailer-mounted, and (4) self-propelled. The doubles rig is fast tripping. Only 66 ft. high when extended, it is simple and fast to operate. The elevators stay on the pipe at all times. Doubles are racked with hydraulic pipe-transfer elevators.

The derrick folds by hydraulic power at two points to a compact, legal road position. Built of high-strength, alloy-steel tubing, the derrick has a four-line load capacity of 145,000 lb. No guy lines are needed for strength.

Rods are easily pulled too. The tubing line stays strung up. No double-lining is needed. Simply unpin and anchor one side of the block. The weight indicator stays in position for use with the rods. **Write or call: Fred E. Cooper Co., P. O. Box 1890, Tulsa, for details on Skytop rig.**



## New unit for drilling or workover

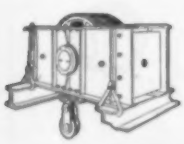
With its input rating of 120 hp., this new unit is capable of doing servicing or workover to 5,000 ft., cable-tool workover to 4,000 ft., and rotary drilling to 2,500 ft. with 3½-in. drill pipe, the maker reports.

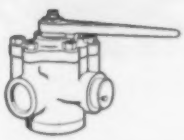
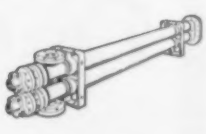
Provided with air controls, the basic unit is designed with cross members for trailer or truck mounting. It comes in two models — A-150 and A-151. Model A-150 is an engine-powered unit. Model A-151 is driven by the truck engine.

Measuring 13 by 41¼ in., the main drum has a spooling capacity of 4,730 ft. of ¾-in. cable. The sandline drum measures 10¾ by 41¼ in. Its spooling capacity is 11,000 ft. of ½-in. line. **Write or call: Cardwell Mfg. Co., Wichita, Kans., for details on Models A-150 and 151 workover units.**

*Mounting generator components of the* ALCO *diesel-electric drilling power package at Beaumont, Texas. With complete engineering and assembly in the oil country,* ALCO *now offers higher efficiency and better service to drillers.*

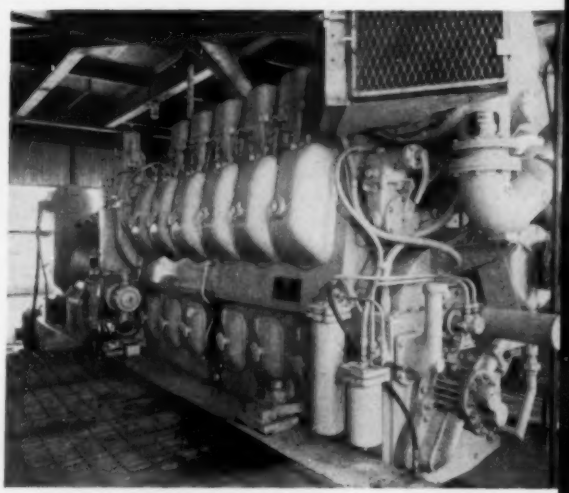
# ALCO DIESEL ELECTRIC DRILLING PACKAGES NOW ASSEMBLED IN TEXAS



***Crown and travelling blocks • Oil-field valves • Wellhead equipment • Kinney plug injectors • Finned tube products***

*Simplest controls of any drilling power package are provided by* ALCO. *Simple handwheel or similar arrangement controls generator output. All drilling operations are controlled from same position. There's less time required to train driller, less chance of errors.*



*Heart of* ALCO *drilling power is turbocharged 251 diesel. Engine delivers high performance with reduced maintenance and fuel consumption. Electrical equipment is specifically designed for the 251 diesel and combines with it to produce the most efficient drilling power available.*

ALCO has now assigned complete responsibility for engineering, assembly and service of its diesel-electric drilling power package to its Beaumont, Texas, plant. From this move you get these unique advantages, unmatched in ALCO'S horsepower range: (1) local supply by the equipment *manufacturer*, (2) integrated design of controls, rotating equipment and engines by people *who know drilling problems*, (3) quick and dependable service from a *local source*.

Three years of field use have already proved that ALCO diesel-electric packages are the most reliable, trouble-free and flexible source of drilling power. The four-cycle, turbocharged 251 diesel engine has an excellent maintenance record, and savings in fuel average 10 per cent over comparable engines. Electric controls and rotating equipment are designed specifically for the ALCO engine. The power package is completely self-contained: No additional power source, a-c or d-c, is required to operate any part of the rig.

Field engineers trained in the operation and maintenance of the 251 diesel and its rotating equipment and controls are located in Houston, Beaumont, New Iberia and Biloxi. All parts are stocked in Beaumont and Odessa. For Bulletin DE-7 with complete information write ALCO Products, Inc., Petroleum Industry Equipment Division, Dept. 181, Bank of the Southwest Building, Houston 2, Texas.

ALCO

**ALCO PRODUCTS, INC.**

**Petroleum Industry Equipment Division**

**HOUSTON**

SHOWCASE . . .

# New Literature

## Facts from the field

. . . on Ideco equipment are summarized in a new series of bulletins. Called Factsheets, they are punched to fit ring binders. The first two Factsheets feature the Ideco rolling disk kelly drive and mud pump valves. Included are reports of field operations and specifications. Cutaway drawings and photos of the equipment in use are shown. **Write or call: Ideco, One of the Dresser Industries, P. O. Box 1331, Dallas 21, for Factsheets.**

## Calgon 15-J

. . . a controlled-solubility phosphate used in the downhole treatment of producing oil wells is described in new Bulletin 41011. The bulletin points out that 15-J is formulated physically and chemically to prevent precipitation of calcium carbonate, calcium sulfate, and barium sulfate in the well bore and on downhole pumping equipment. The new oil-field chemical also provides similar protection to surface equipment, gathering lines, and treating tanks when properly applied through a bypass feeder, the maker says. Complete solubility data and recommended dosages for combating various scale conditions are contained in the new bulletin. **Write or call: Calgon Co., Hagan Building, Pittsburgh 30, for Bulletin 41011.**

## Pipeline bridge building

. . . is discussed in new four-page Bulletin 303. The publication pictures a number of modern bridges built for pipeline crossings, including suspension, truss, trestle, and cantilever types. **Write or call: Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh 25, for Bulletin 303.**

## Thermal-insulation products

. . . are described in a well-illustrated, 63-page catalog printed in Spanish. The booklet describes the manufacturer's complete line of magnesia, asbestos, and felt-insulation products for oil refineries and other processing and power plants and other equipment requiring heat insulation. A tabulated section gives thermal conductivities and other technical data. Photos of actual installations in refineries and power plants in various parts of the world are included. **Write or call: Newalls Insulation Co., Ltd., Washington, County Durham, England, for Thermal-Insulation Products catalog.**

## Pipeline equipment

. . . is discussed in new 16-page Catalog CR-612-H. It shows a complete line of crawler tractors with sidebooms and other attachments for use in the petroleum industry. The text and photos cover pipeline jobs in all sections of the country. **Write or call: International Harvester Co., 180 North Michigan Avenue, Chicago 1, for Catalog CR-612-H.**

## Simple drilling control

. . . Bulletin GEA-6653 is a four-page illustrated booklet. It explains how oil-well drilling-drive systems with simplified controls provide lower cost per foot of hole. It also details rig maintenance, drilling control, rig portability, and drilling-equipment protection. **Write or call: General Electric Co., Schenectady 5, N. Y., for Bulletin GEA-6653.**

## Dual-string wellhead

. . . equipment for working pressures up to 3,000 and 5,000 psi. is described in new Bulletin 480. Five types of equipment are offered in this new 12-page bulletin for various requirements or conditions of use. Illustrations include line drawings that show design features. **Write or call: National Supply Co., 2 Gateway Center, Pittsburgh 22, for Bulletin 480.**

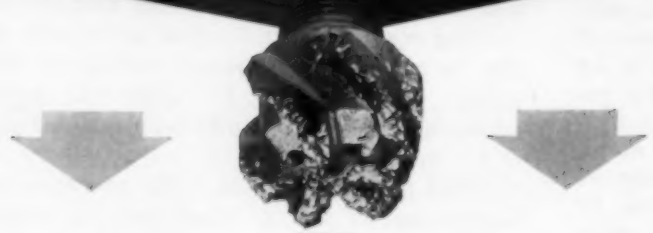
## Triplex pumps

. . . are described in a new 12-page bulletin. The pumps are in use where high pressure—up to 20,000 psi.—and high temperatures—in excess of 500° F.—are required. Applications include operation of hydraulic test equipment, lubricating systems, and oil-well pumping. Complete descriptions of the pumps and their ratings are contained in the bulletin. **Write or call: Kobe, Inc., 3040 East Slauson Avenue, Huntington Park, Calif., for Triplex pump bulletin.**

## Keeping pressure constant

. . . in core analysis is detailed in new Application Engineering Data Sheet E-57-3. The bulletin covers the application of Constametric Minipumps in core analysis. The four-page data sheet explains the background and problems met in determining permeability and porosity data. And it describes how to maintain required pressures without pulsation with the pumps for accurate data evaluation of liquid-flow characteristics of low-permeability rock samples. **Write or call: Milton Roy Co., 1300 East Mermaid Lane, Philadelphia 18, for Data Sheet E-57-3.**


WHIP DOWNHOLE MILLING COSTS
WITH KINZBACH SPEEDMILLS



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Continuously renewed multiple cutting edges, in optimum arrangement with tool shape, work contact areas, flushing passages, and other factors combine to make Kinzbach Speedmills highly efficient for downhole metal cutting operations.

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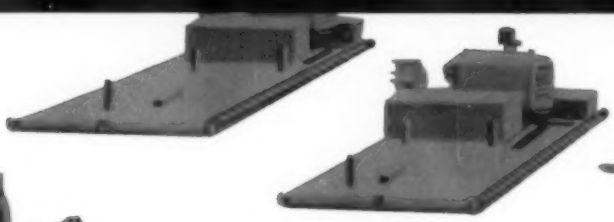
**IN LOWER COSTS**
A big factor on any rig is labor cost. Power equipment gives you lower costs per foot.

**IN GREATER SAFETY**
Remote control keeps crews away from danger. Lack of fatigue keeps crews from getting careless. Safety keeps insurance rates lower.

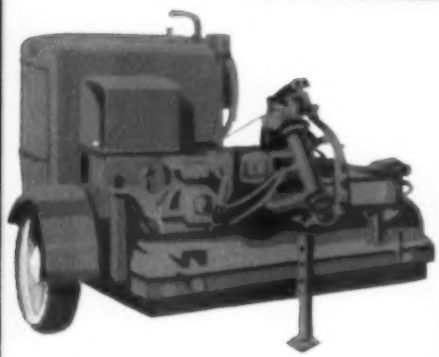
**IN GREATER SPEED**
With power tools, crews can work faster and can maintain a faster pace without fatigue.

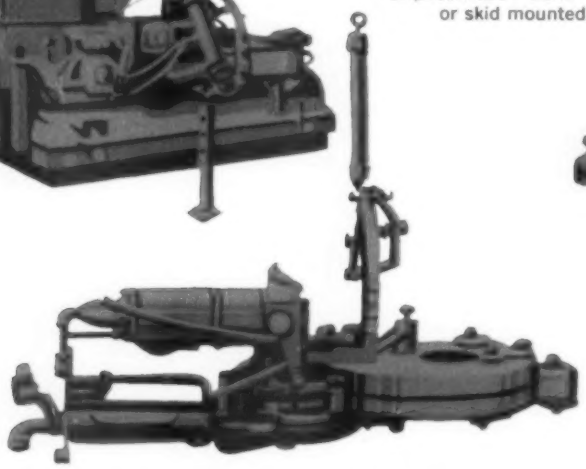
**IN GREATER EFFICIENCY**
Power tools do a better job—more uniformly. No galled threads. No damaged equipment.

# BJ Power Tools

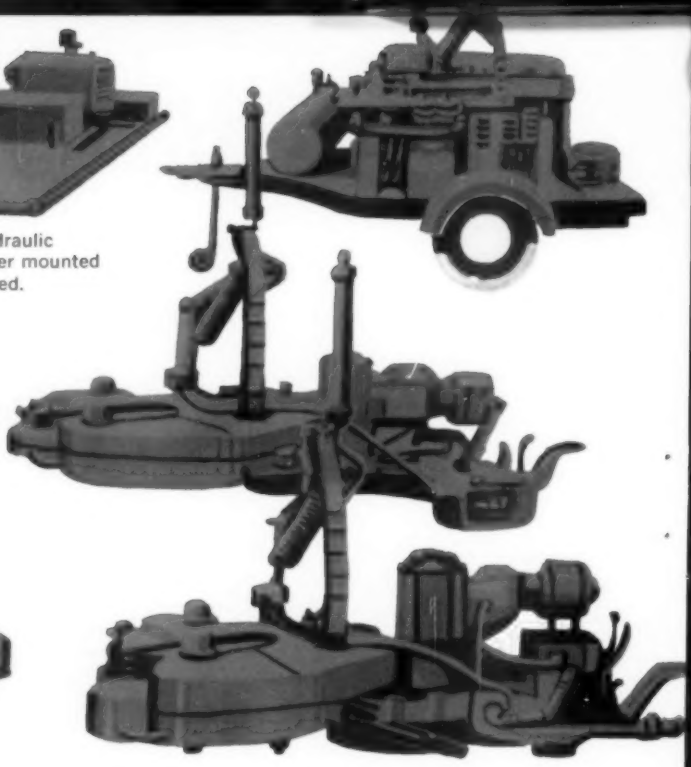


**BJ POWER UNITS** Hydraulic or pneumatic—trailer mounted or skid mounted.

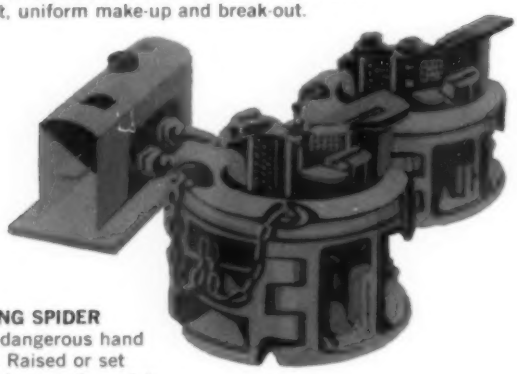




**POWAIRMATIC TUBING TONG** One-man operation. Fast, uniform make-up and break-out.



**HYDRATORC TUBING TONG** Two models. Greater horsepower and speed for tubing, workover, or slimhole.



**POWER TUBING SPIDER** No dangerous hand setting. Raised or set by remote pedal. Hydraulic or pneumatic.

**BJ POWER SLIPS** Become integral part of table. Driller raises or sets by pedal control.

# *Power* CUTS DRILLING COSTS

## ...and BJ offers the only *Full Line* of Power Tools!

In these cost-conscious days, it is more important than ever to increase efficiency, and stretch every drilling dollar to its utmost. The most practical way is with POWER! The more power used on a rig, the lower the cost per foot. Byron Jackson brings the petroleum industry hydraulic and pneumatic muscles to do its job cheaper, faster, and safer with methods that keep rig crews fresh and alert.

Byron Jackson offers you a *full line* of power tools—all a result of BJ research and development—all engineered to work as a team.

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Export Address: 580 Fifth Avenue, Suite 510, New York 36, New York

## The Brewster Co. Names Pickering Sales Manager . .

BILL PICKERING

according to an announcement from Harry B. Marioneaux, first vice president and general manager.

Bill Pickering, who has more than 25 years in the oil field including 10 years in field service, has sales experience covering heavy equipment in all phases of drilling, production, and pipeline supplies. Before joining Brewster 4 years ago, he was with Bethlehem Supply Co. for 10 years and previously was in the production department of Placid Oil Co.

Marioneaux stated that Pickering will direct the sales division of Brewster's heavy drilling equipment in both domestic and international markets. Foremost in the Brewster product line are draw works for drilling both offshore and onshore in a depth range of 2,500 ft. to 20,000 ft. plus. The 48-year-old firm also manufactures rotary tables, swivels, blocks, wire line reels, winches, and christmas trees.

## The Garlock Packing Co. Appoints K. C. Wizeman . .

K. C. WIZEMAN

to the post of product manager, metal packing line, according to R. C. McGonigal, manager of the product planning department.

He will be responsible for marketing of all metal packings for the company. He joined the firm in 1946 as an engineer in the metal division of the service department. He subsequently was named manager of the metal packing division, product engineering department. In 1957 he was appointed staff superintendent, metal division.

## The Western Co. Making New Type Pumping Unit . .

for oil-field fracturing jobs in its Midland, Tex., fabrication shops. The pumpers provide greater power output without increase in the rated horsepower of the pump engines, according to Walter Beadle, vice president in charge of operations and sales.

A 600-hp. Cummins diesel engine drives the pump. The increase in available power is accomplished by using the truck engine to power all auxiliary equipment during pumping operations, freeing the deck-mounted diesel to apply full power to the pump. The engine drives the pump through a torque converter and a heavy-duty industrial transmission.

Western has been using the RB-80, a triple-type pump, more than 3 years on its Fracmaster units. The new units have all "hot spots" shrouded, the exhausts shielded, and a special water system is provided to handle internal danger points when emergency shutdown controls are activated.

**This new type pumping unit built by Western was field-tested before being put into production.**

## Baroid Division Announces Three New Appointments . .

in its Louisiana sales organization. R. G. Jones has been appointed sales representative at Harvey, La. G. S. Houser, formerly district manager in Abbeville, La., has been named district manager at Harvey. B. M. George, formerly field representative at Lake Charles, La., replaced Houser as district manager at Abbeville.

## Snyder, Xeros Named By Joy Manufacturing Co. . .

as product manager for the oil field drill division and as chief engineer, respectively.

Lenard D. Snyder will direct the division's engineering and manufacturing operations. Constantine M. Xeros, who succeeds Snyder, will be in charge of the design of portable drilling rigs.

L. D. SNYDER

C. M. XEROS

Snyder joined the organization in 1955 as chief engineer. Prior to that, he was chief engineer for Drilling Accessory & Manufacturing Co., Dallas; mechanical engineer for Continental Oil Co., Ponca City, Okla.; and design engineer with George E. Failing Supply Co., Enid, Okla.

Xeros has been with Joy's oil field drill division since 1954, serving successively as project engineer and manufacturing manager. Before joining the firm, he was assistant chief engineer, Drilling Accessory & Manufacturing; senior design engineer, Collins Radio Co., Dallas; project engineer, Engineering Laboratories, Inc.; design engineer, Intercontinental Manufacturing Co., and engineering instructor, Southern Aircraft Co.

## Ted Mosher Appointed Industrial Sales Mgr. . .

according to C. W. Sawhill, general sales manager of the western division, Aeroquip Corp. Mosher will be responsible for the division's industrial distributor, OEM, and marine sales in

the territory west of the Rocky Mountains.

He joined Aeroquip in 1951, and became a sales engineer in 1952. Before his recent promotion, he was in charge of industrial distributor, marine, and OEM accounts in southern California and Arizona.

## Win-Well Manufacturing Co. Appoints V. L. Lewis . .

V. L. LEWIS

as sales manager according to Robert Forsman, president. Lewis will supervise sales development on the Win-Well 7-way Multiport selector valve.

Lewis is a veteran of 15 years in the production-equipment sales field, having served with Emsco Manufacturing Co. at Great Bend, Kans.; Snyder, Tex.; Healdton, Okla.; and Tulsa. He also served the Oklahoma City store for Bethlehem Supply Co.

## Mason-Neilan Establishes Instrument Sales Group . .

with James M. McAlear as manager. The division of Worthington Corp. is headquartered in Norwood, Mass.

McAlear will supervise the sale of the complete Masoneilan instrument line, including pneumatic controllers, 60,000 Series instruments, liquid level controls, temperature and pressure transmitters, and related products.

## Taldon Manton Appointed . .

oil field representative in Fort Worth, Dallas, and northern Texas by Alten Foundry & Machine Works, Inc., Lancaster, Ohio. Manton will handle the firm's line of pumping units.

He will headquarter in Fort Worth.

## W. R. Covin Promoted By Hewitt-Robins, Inc. . .

to be district manager in the Houston area industrial products division, J. W. Pew, Houston, manager, South Central sales region has announced.

Covin's territory will include southern Texas and eastern Louisiana. He joined Hewitt-Robins in 1947 as assistant sales engineer, and was promoted to field engineer in 1951.

## Continental-Emsco Co. Opens New Supply Store . .

**in Maracaibo, Ven. This latest addition for the oil-field supplier-manufacturer brings the total to three stores and offices in Venezuela. The new store will have John R. Aston as manager. Continental-Emsco operates in Venezuela as Continental-Emsco Co. C. A.**

## HOMCO Opens Fishing and Cutting Tool Branch . .

in Pampa, Tex. The Houston Oil Field Material Co., Inc., store will be under the supervision of J. O. Redmon and Hoyt Johnson.

The personnel located in Pampa are: Lowell M. Ebeling, William C. Heard, fishing tool supervisors; Carey L. Duff, warehouse manager; Edward F. Galvin, electrical well service supervisor; and Walter H. Nolen, electrical well service rigger.

The store has a line of fishing and cutting tools and electrical well services.

## Mobile Magnaflux Inspection Unit Set Up By Drilco . .

**in Shreveport. It is complete with all tools for drill collar joint inspection and maintenance of joints on the rig where repairs can be made with hand tools.**

**In the picture, V. V. Hibler, assistant sales manager of Drilco Oil Tools, Inc., Midland, Tex., is discussing the Magnaflux unit with Zane Duff, Drilco's inspector in Shreveport for the Ark-La-Tex area.**

**The drill-collar inspector saves the drilling contractor money by locating and rejecting badly cracked connections to prevent fishing jobs; locating minor cracks; locating washed and damaged shoulders; and checking connections for "stretched pins" or "swelled boxes" before trouble occurs.**

**Duff has 10 years experience inspecting on drilling rigs. Glenn Chance is the Drilco representative in Shreveport.**

## Schlumberger Makes Six Field Staff Changes . .

involving location managers and sales engineers.

D. B. Davis, formerly senior sales engineer in Denver for Schlumberger Well Surveying Corp., has been named manager at Cody, Wyo. H. T. Carson, formerly manager at Falfurrias, Tex., is now stationed in Alice, Tex., as station manager. F. A. Rice has been transferred from Alice to Falfurrias as manager.

The former manager of the perforating location at Farmington, N. M., J. L. Hallman, has been transferred to Denver, Colo., as senior sales engineer. Don Fitzgerald, sales engineer in Houston for a time, continues in the sales field in Wharton, Tex. W. B. Jackson, sales engineer, has been transferred from Houston to Beaumont, Tex.

## New Venezuelan Wire Line Service Formed

This company has been set up by Oilfield Sales & Service, S. A., a subsidiary of U. S. Industries, Inc. It is called Oilfield Wire Line Service, S. A., and will function as a subsidiary of Oilfield Sales & Service. Heading it as manager is Thomas G. Lewis.

The wire-line company will maintain an office in Maracaibo, but operations will be conducted from a base camp in Tia Juana. It will operate diesel-powered, skid-mounted wire line units which are specially designed for lake operations. It will supply a line of tools which will make it possible to service virtually all equipment used in the Maracaibo area. The company will also service all types of tubing-testing tools and plugs and sand bailers. It will conduct Amerada pressure surveys. A high-speed steel launch will be on hand at all times to transport crews and equipment to lake locations.

## The Trane Co. Promotes Gerald T. Kerbow . .

to manager of its Houston sales office. Prior to his promotion, he was with the Houston office as sales engineer for 8 years.

Trane is a manufacturer of air conditioning, heating, and ventilating equipment.

## Tex-Tube, Inc., Opens Division Sales Office . .

R. B. WALLACE

in Tulsa, according to Charles A. Carter, president. The new installation is headed by R. B. Wallace as manager.

Wallace, in his new position, will supervise Tex-Tube activities in Oklahoma, Kansas, Nebraska, and northern Arkansas. His past activity has been devoted extensively to sales and production work in pipe and pipe specialty products.

Tex-Tube operates as a warehouse-distributor for tubular products serving southwestern industries.

## R. M. Sachere Assigned By Blaw-Knox Co. . .

as a senior process engineer in its chemical plants division. He will specialize in design and construction services offered to the petroleum and petrochemical industries.

His most recent positions include 8 years in project engineering with Arthur G. McKee & Co., and 3 years in project and process engineering with Wyandotte Chemicals Corp.

## A. A. Straub Co., Inc., Names Representatives . .

to handle application engineering and sales of the company's line of gas generating equipment and inert gas processing equipment. The new representative will contact firms in the chemical and petroleum industries.

The new firms appointed include: Johnston Engineering Sales Co., Wayward, Mass., New England and eastern New York; F. P. Purvis, Phoenix, Ariz., the states of Arizona and New Mexico; Clifford Armstrong Co., Detroit, Mich., lower Michigan and Toledo, Ohio; Marshall, Neil & Pauley, Inc., Houston, eastern Texas, Louisiana, and southern Arkansas; Coram Tool Steel Gear Sales, Ltd., Hamilton, Ont., all Canada; Preferred Equipment Co., Los Angeles, southern California; Hugh P. Coulter Co., Jamestown, N. Y., western New York; and Fred I. Johnson Co., Elmhurst, Ill., covering northern Illinois, northern Indiana, eastern Iowa, and Wisconsin.

## J. G. Vlahos Boosted By Anchor Petroleum Co. . .

J. G. VLAHOS

to the post of assistant sales manager in the LP gas division, according to an announcement by W. A. Baden, president.

Vlahos is a 12-year veteran of the company's sales and distribution departments. Anchor is an independent marketer of petroleum products, specializing in petroleum products and derivatives.


**partners in petroleum progress . . .**

**OFFICES**

COLORADO—Denver, Ft. Morgan. ILLINOIS—Crossville. KANSAS—Great Bend, Liberal. LOUISIANA—Shreveport, Lafayette. MISSISSIPPI—Laurel. MONTANA—Billings. NEBRASKA—Kimbal. NEW MEXICO—Hobbs, Farmington. NORTH DAKOTA—Williston. OKLAHOMA—Norman, Pawhuska. TEXAS—Abilene, Tyler, Odessa. UTAH—Vernal. WYOMING—Casper, Worland.

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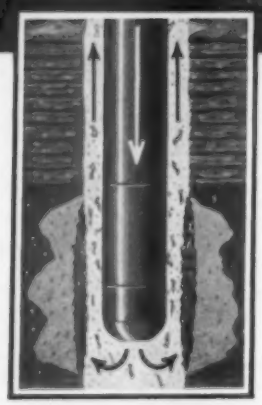
ENGLAND—Bromley, Kent, c/o F. Harold Gray, "Coniston," Cumberland Road. FRANCE—Paris, c/o Precidia, S.A., 7 Rue De Chateaudun; Cable: "Precidiaso-Paris." ENGLAND—Basingstoke, Hampshire, c/o L. M. Van Moppes & Sons, Ltd., Cable: "Diatipt-Basingstoke." ITALY—Milan, c/o L. M. Van Moppes & Sons, S.p.A., via Calamatta 10, Cable: "Monoclinic." GERMANY — Frankfurt/Main, c/o Joh. Urbanek & Co., Baumweg 45/47, Cable: "Urbanekco." CANADA—West Calgary, Alberta, c/o Denton-Spencer Company, Ltd., 1134 8th Avenue.

**SOUTH AMERICA**

ARGENTINA—Buenos Aires, c/o Kenneth J. Langley, Corrientes 1115, Cable: "Langco." VENEZUELA—Caracas, c/o Petroleum Industry Consultants, C.A., Apartado 3952, Cable: "Peticon." BRAZIL—Rio de Janeiro, c/o H. V. Lage, Rua Mexico 45-11 Andar, Cable: "Siminal." NEW YORK, U. S. A.—New York 36, c/o D. T. O'Connor, 500 Fifth Avenue.

TRUCO DIAMOND BITS Drilling & Service INC. | DIAMOND DRILLING EQUIPMENT



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*Products for the oil industry* **DOWELL**

A SERVICE SUBSIDIARY OF THE DOW CHEMICAL COMPANY

# What oil men do in slack times

BY CARL HOOT

OIL MEN find **oil** during slack times, or else.

Theirs is a peculiar business, with problems all its own. The day they start to produce is the day they start out of business. So, good times or bad, oil men find replacement oil, or else.

The map shows a portion of West Texas, where big companies and small independents found a lot of new oil over the first couple of months of 1958. Geologically, it's part of the Midland basin and Eastern shelf, and the counties shown occupy the northeastern corner of the big Permian basin.

Stars on the map are discoveries, hot prospects, or new pools. A quick rundown on these discoveries, numbered on the map, shows where the drilling was:

1. Devonian discovery, located off the northwest tip of Spraberry Trend, about 5 miles north of Devonian and Strawn successes in Azalea area of Midland County. Texas Pacific Coal & Oil Co. 1 McAlister flowed 281 bbl. of oil a day through small choke, from pay between 11,294-11,410 ft. Phillips Petroleum Co. is drilling a west offset.

2. Pennsylvanian pay, southeastern Dawson County. George R. Gibson 1 Graves opened Ackerly, North field. Potential was 148 bbl. a day from reef at 9,275-82 ft. Location is near the Ackerly Spraberry and Dean field. Nearest comparable production is 4 miles north in Jo-Mills (Canyon) field, but separated by structure.

3. Pennsylvanian, Borden County. Nortex Oil & Gas Corp. 1 J. B. Clayton, located between Good, NE, and Gail, SW, both Canyon fields. Potential was 433 bbl. of 45°-gravity oil a day, from reef at 8,137-47 ft.

4. Wolfcamp discovery, Howard County. C. W. Guthrie 1 Burris opened basal Permian pay in an area of Pennsylvanian reef pools. Potential was 154 bbl. a day without treatment, from 6,274-94 ft. Total depth of 7,501 ft. tested the reef.

5. Pennsylvanian, Scurry County. Trice Production Co. 1 Towle opened a new reef structure or extended Diamond M field. Potential was 157 bbl. on the pump, from 6,926-35 ft. The well is 1 mile south of nearest production.

6. Pennsylvanian, Scurry County. J. J. Travis, Trustee 1 Ira Siratt flowed 146 bbl. a day from reef pay at 6,900-10 ft. It extended Tri Rue reef field to the southwest.

7. This is a hot prospect a mile and a half southeast of U-Lazy S field, a prolific new multipay field opened this year in northern Borden County. Dalton H. Cobb and Empire Drilling Co. 1 Dalton had flowing oil on initial drill-stem test in the Pennsylvanian at 8,328-63 ft. It was shut in to drill ahead to the Ellenburger. U-Lazy S field was opened to Ellenburger production and has three wells, all of which are dually completed with Pennsylvanian as the second pay.

8. Strawn, Garza County. T. M. Evans 1 Slaughter estate, an Ellenburger explorer backed up to make a Pennsylvanian discovery. Potential was 196 bbl. from 7,951-65 ft. Nearest production is Teas-Spraberry field, 2 miles south.

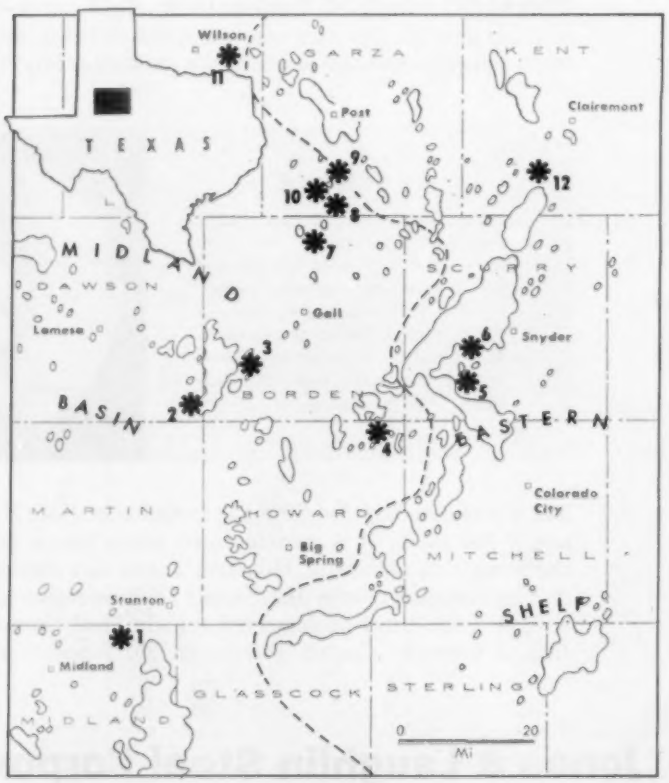
9. Dual opener, Pennsylvanian and Ellenburger, Garza County. Shell Oil Co. 1-C Slaughter estate flowed 607 bbl. of oil from Pennsylvanian pay at 8,069-8,127 ft. and 342 bbl. from the Ellenburger at 8,295-8,406 ft. Location is just northeast of Teas-Spraberry field.

10. Dual opener, Pennsylvanian and Ellenburger. Paul C. Teas 1-B Slaughter, on the southwest side of Teas-Spraberry field, flowed 710 bbl. from the Pennsylvanian at 7,797 ft., and 268 bbl. from the Ellenburger at 8,333 ft.

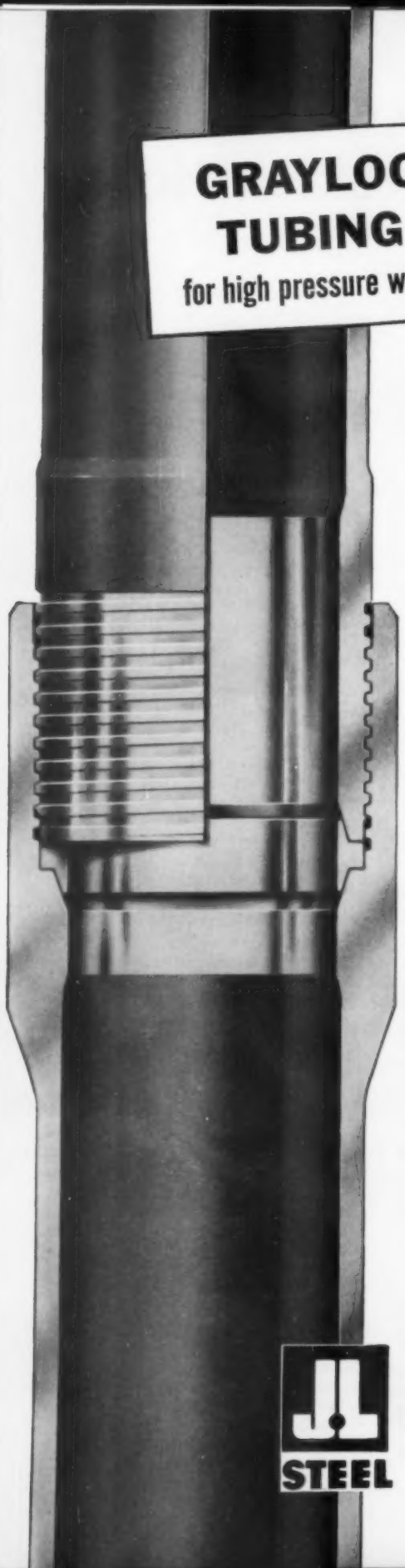
11. Glorieta discovery, Lynn County. Herman Brown 1 Coleman, 3 miles east of Wilson. Pumped 42 bbl. a day from pay at 4,262 ft.

12. Pennsylvanian discovery, Kent County. R. J. Zonne 1 Mays opened reef production at 6,800-18 ft. Potential was 159 bbl. a day through small choke.

Good times or slack, West Texas oil men are still finding oil.




**SUCCESSFUL WILDCATS** and new-pay ventures in fields are indicated by stars. The area is Central West Texas.



# GRAYLOC TUBING
## for high pressure wells

# *"has joint as strong as the tubing itself!"*

Jones & Laughlin announces availability of Grayloc tubing for completion of deeper wells and tapping formations with greater pressures. This 100% leak-resistant joint separates the three major functions of tubing connections into these most efficient components:

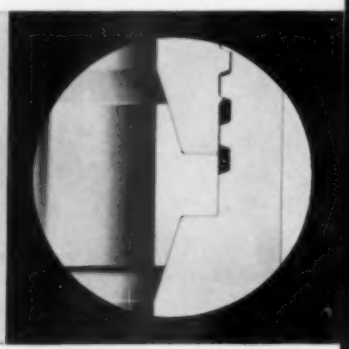
**GRAYLOC SEAL.** An independent ring seals against mating seats to form a surface seal that will safely hold the highest well pressures yet encountered. This exclusive seal also holds the full hydrostatic head of mud in the annulus of the deepest wells.

**GRAYLOC THREADS.** The modified Acme threads provide easy stabbing, resist wear and offer 100% strength. The heavy, square threads stand up under repeated make-up without impairing joint efficiency.

**GRAYLOC TORQUE SHOULDER.** Rigid rib of the seal ring provides a positive step on power make-up, eliminates creepage and any tendency for swelling of box end.

### FEATURES

- Sealing member provides 100% leakproof connection.
- Reduced O.D. makes for efficient use in multiple completion wells.
- Integral joint reduces by one-half the number of thread connections.
- Joints can be made up repeatedly without excessive wear and they retain leak resistance.



J&L's exclusive Grayloc tubing is available in J-55, N-80 and P-105 steels. It is manufactured under license from the Gray Tool Company, Houston, Texas. Get complete details from your nearby J&L Supply Division representative, or write direct to Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

**Jones & Laughlin Steel Corporation**

3 Gateway Center, Pittsburgh 30, Pennsylvania

# Pre-Cretaceous—

## Alberta's big source of OIL

# Cretaceous—

## Alberta's big source of GAS

BY J. R. POW

Chief geologist, Oil and Gas Conservation Board, Calgary

GEOLOGICAL and geographical distribution of known oil and gas reserves in Alberta show that to date, about 27% of the recoverable oil reserves and 41% of the disposable gas reserves of Alberta have been discovered within the conglomerate and sandstone reservoirs contained by formations of Cretaceous age.

The remaining reserves have been found nearly entirely in the limestone and dolomite reservoirs of the underlying formations of Mississippian and Devonian age.

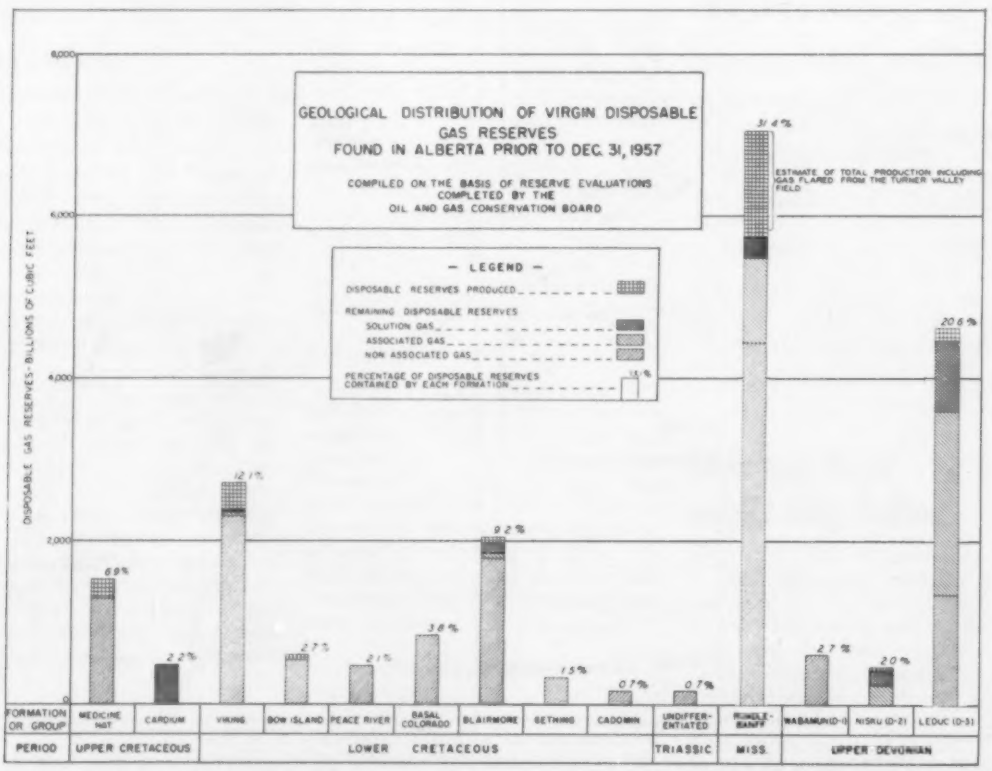
The relative significance of the major productive formations from the standpoint of discovered reserves is illustrated by Figs. 1 and 6. These charts indicate that the majority of the recoverable oil reserves have been found in the Cardium and Leduc (D-3) formations and that the preponderance of disposable gas reserves have been discovered in the Rundle group and the Leduc formation.

... The geographical distribution of the known oil and gas reserves within the main producing formations of the province is illustrated by Figs. 2-5, inclusive. It is evident that the boundaries outlining the reserve areas may approximate either the truncated edges of the productive formation, the areal extremity of suitable trap development within the formation, or the limits of the successfully explored portion of a formation that is potentially productive over a wider area.

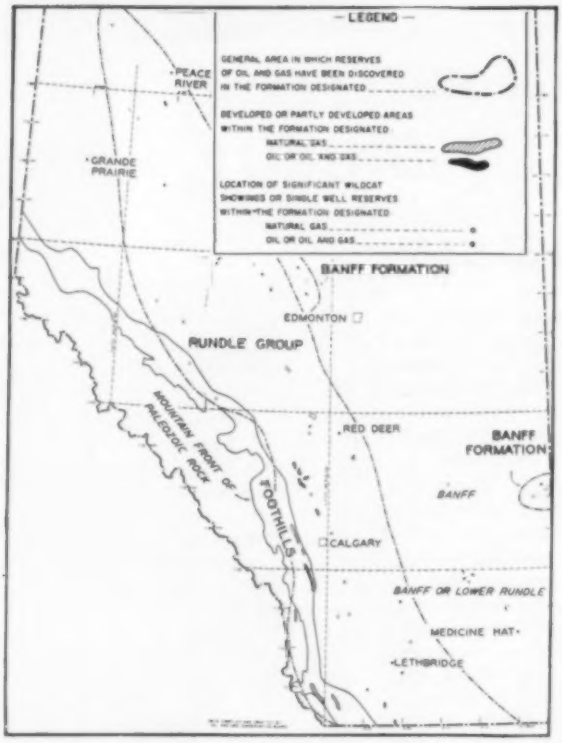
... Future exploration. It is expected that future exploration will result in the discovery of additional large reserves both within and outside of the presently delineated general reserve areas. Recent important gas discoveries in certain Mississippian and Devonian formations of the foothills and eastern mountains and oil discoveries in other Devonian formations underlying a part of northwestern Alberta are highly significant as they reveal the potentiality of formations and regions that, until recently, were not considered as highly prospective.

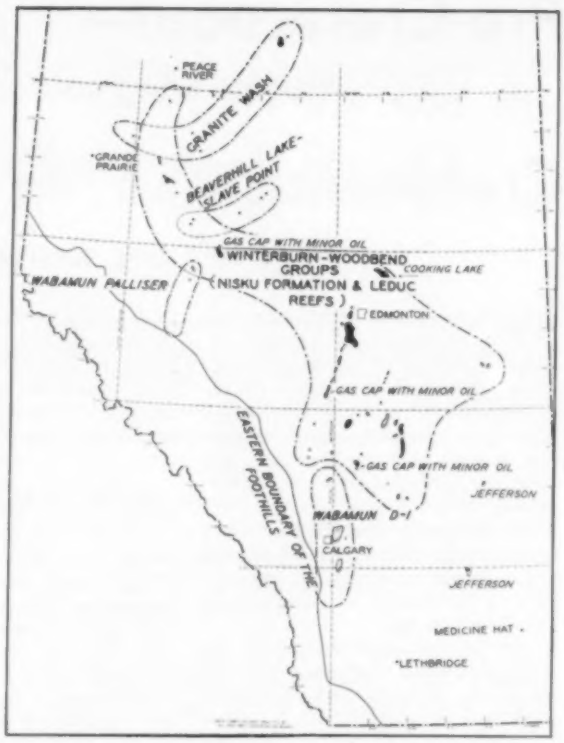
Geological characteristics of the oil and gas fields of Alberta indicate oil

This is a portion of a paper prepared as a chapter in the brief submitted by the Board on February 3, 1958, to the Borden Royal Commission on Energy.

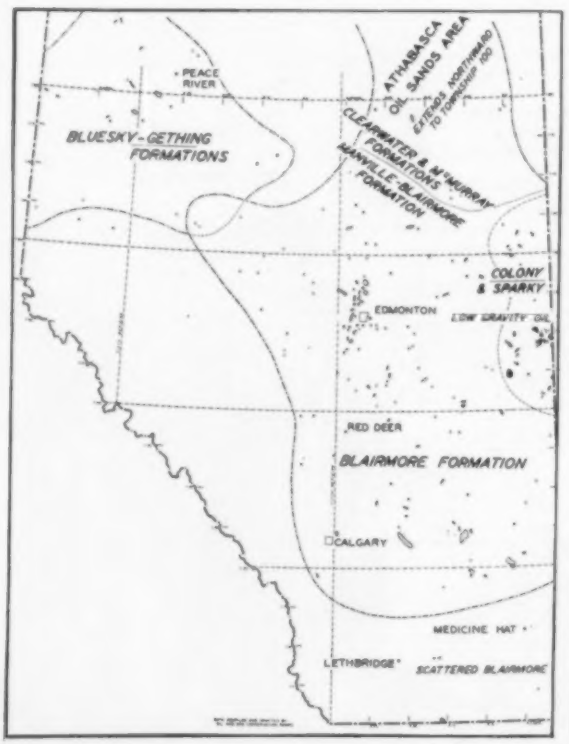


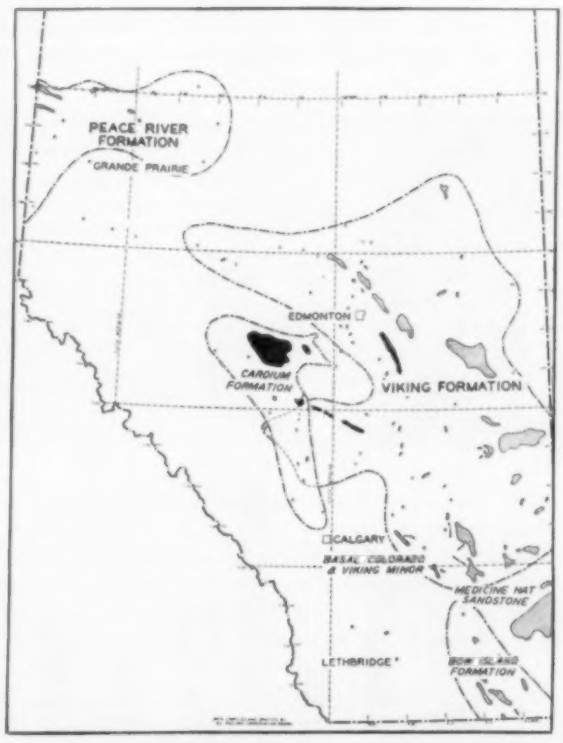

**NEARLY HALF** of the disposable gas reserves of Alberta have been found in rocks of Cretaceous age. Fig. 1.



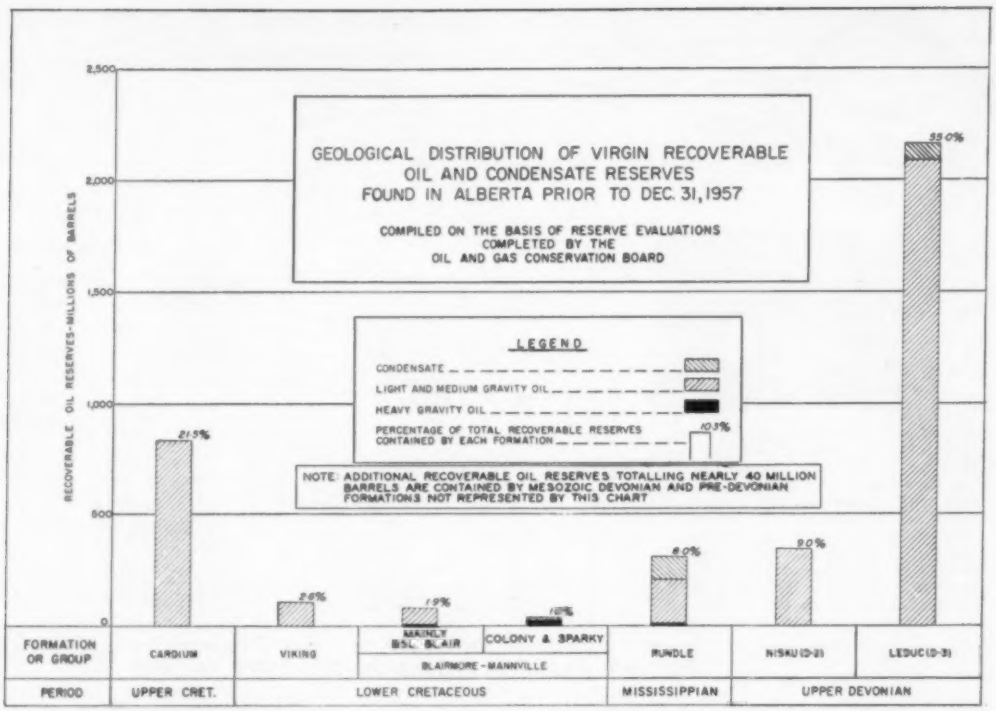




**AREAS IN ALBERTA** where oil and gas have been discovered in rocks of the Mississippian (left) and Devonian (right) ages. Figs. 2-3.




**AREAS IN ALBERTA** where oil and gas have been discovered in rocks of the Lower Cretaceous (left) and Upper and Lower Cretaceous (right) ages. Figs. 4-5.




**OVER HALF** of the recoverable oil and condensate reserves of Alberta are contained in rocks of Upper Devonian age. Fig. 6.

and gas have been localized by stratigraphic, structural, and combined stratigraphic-structural traps within the formations of Alberta.

- **Stratigraphic traps**

The sizes and shapes of the stratigraphic traps underlying the Alberta plains are varied. The Cardium reserves and many of the Viking reserves have been localized within wide-spread but thin blanket deposits of sandstone contained within a host rock of shale. Other Cretaceous reserves are contained by small sandstone lenses or by narrow and elongated deposits of sand.

Mississippian oil reserves have accumulated in southwestern Alberta where a portion of a tilted reservoir formation was decapitated and the area later covered by a layer of impervious rock. Mound-shaped Devonian reefs of porous carbonate rock contain large reserves that are confined to the reefs by surrounding shale. Other Devonian reserves are trapped within a development of porous dolomite contained by a regionally tilted formation of impervious dolomite.

- **Structural traps**

In the foothills and eastern mountains of western Alberta, the Mississippian oil and gas reserves have been localized at great depths by structural traps produced by intense forces of compression and shearing.

Under the northwestern plains, large gas reserves have been discovered in Cretaceous reservoir formations that were distorted into dome structures by the crustal adjustments of the basement rock.

Additional structural traps occur in the Devonian Nisku or D-2 formation where it has been warped into a dome structure by differential compactness with a lower formation and where its porosity and permeability are developed over the entire structure.

- **Combination traps**

Many examples of combined stratigraphic - structural traps occur beneath the Alberta plains. The most common are the numerous Gething, Blairmore, and Mannville pools that have accumulated within lenticular deposits of sand covering a part of a dome or plunging anticline, the latter being associated generally with underlying Paleozoic erosional remnants or reefs.

**Acknowledgment**

The writer acknowledges the assistance rendered by the Geological and Drafting Departments of the Oil and Gas Conservation Board in the preparation of the illustrations contained in the original paper. The entire paper appeared in the Daily Oil Bulletin, February 15, 1958.

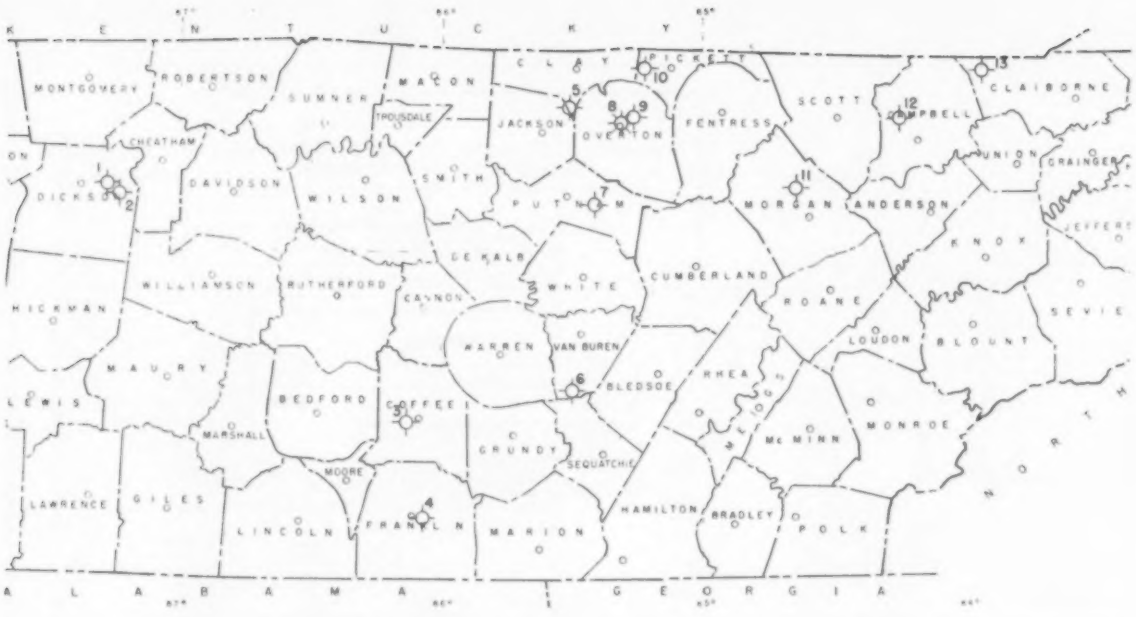
## Walhonding is stretched in Ohio

SUCCESSFUL completion of a step-out extension of Walhonding pool into south center Tiverton Township, Coshocton County, was announced by the operator, J. I. Hall and Associates.

The producer, on 1 Leech-Urey, Lot 2, logged the Clinton sand at 3,173-3,229 ft. with a gage of 12 bbl. natural and 50 bbl. and 300 M.c.f. gas in a 24-hour test after fracture.

## Ohio gas field swells near Dalton

A GAS POOL of some importance is being developed southeast of Dalton along the Wayne and Stark county line. The fourth well in the pool, completed by Wiser Oil Co. on 1 Lewis Withrich, Section 13, Sugar Creek Township, Wayne County, gaged 450 M.c.f. natural in Clinton sand found at 4,092-4,158 ft. and increased to 2,250 M.c.f. after fracture. Four additional wells are drilling on semiwildcat locations in the area.




IMPORTANT WILDCATS DRILLED IN TENNESSEE IN 1957

Scale, in miles: 0 20 40

Legend
- Dry hole
- Gas well - small

| Map No. | County | Operator | Location | Total depth (ft.) | Surface formation | Deepest zone tested | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Dickson | Hembree et al. | 12- 4s-27e | 985 | M. Miss. | L. Ord. | D. & A. |
| 2 | Dickson | Joe Harp Oil Co. | 17- 4s-28e | 1,002 | M. Miss. | L. Ord. | D. & A. |
| 3 | Coffee | Harper et al. | 8-13s-41e | 770 | L. Miss. | L. Ord. | D. & A. |
| 4 | Franklin | Bryson et al. | 24-16s-42e | 1,513 | M. Miss. | U. Knox | D. & A. |
| 5 | Clay | Regenstrief et al. | 21- 1s-48e | 1,054 | L. Miss. | L. Ord. | D. & A. |
| 6 | Van Buren | Godfrey L. Cabot, Inc. | 5-12s-49e | 5,065 | L. Penn. | L. Knox (?) | D. & A. |
| 7 | Putnam | Highland Rim Oil & Gas Co. | 6- 5s-50e | 1,862 | M. Miss. | U. Knox | D. & A. |
| 8 | Overton | H. B. Nevans | 6- 2s-51e | 536 | M. Miss. | M. Ord. | Gas, small |
| 9 | Overton | S. D. Jarvis Co. | 1- 2s-51e | 2,375 | U. Miss. | U. Knox | D. & A. |
| 10 | Pickett | Polkinghorn et al. | 8-A-52e | 1,728 | M. Miss. (?) | U. Knox | D. & A. |
| 11 | Morgan | Tennessee Copper Co. | 17- 4s-59e | 2,302 | L. Penn. | Ord.-Sil. | D. & A. |
| 12 | Campbell | Columbian Carbon Co. | 6- 2s-64e | 3,457 | L. Penn. | Ord.-Sil. | D. & A.* |
| 13 | Claiborne | W. W. Mausch | 11-A-67e | 3,129± | L. Penn. | Ord.-Sil. (?) | D. & A. |

*Good show of gas in Chattanooga shale.

## Two west; none east; the rest in the middle:

# Tennessee's '57 score is 32

THE THIRTY-TWO test wells drilled in Tennessee in 1957 had a total of more than 39,000 ft. of exploratory footage. Five of these were small gas wells but no commercial oil was discovered.

### Development

Exploration was concentrated in the middle Tennessee geologic province with only two attempts made to find production in the West Tennessee province and none in East Tennessee. One of the West Tennessee tests was stopped before testing the Paleozoic rocks and the other started at 3,289 ft. in the old Pure Oil Co. 1 Gray in Lauderdale County and was drilled to 5,000 ft. before being abandoned.

On the Cumberland Plateau, six tests were drilled. Two of these, drilled in the old Boone Camp producing area, made small gas wells and were put on the existing gas line with production estimated at less than 2 M.M.c.f. per month each. The pay is in Upper Mississippian formation.

Good shows of gas were reported in Campbell and Claiborne County tests, and in the Tennessee Copper Co. 1 Pilot Mountain in Morgan County, but efforts to complete them were unsuccessful. Godfrey L. Cabot, Inc., 1 Rocky River in Van Buren County had a total depth of 5,065 ft. with a show of gas at 3,389-97 ft. Top of the Knox dolomite was approximately 2,850 ft.

BY H. C. MILHOUS
Nashville, Tenn.

Author is senior geologist, Tennessee Division of Geology.

Shallow gas was obtained in two wells in Macon County and one in Overton County. Figures were not available on the potential of these wells.

Ten tests were drilling or temporarily shut down at the end of December and interest was unusually high for that time of the year.

### Oil Production

Total oil production was 7,163 bbl. Following is a breakdown by counties: Clay County, 382 bbl.; Fentress County, 325 bbl.; Morgan-Scott counties, 6,262 bbl., and Picket County, 194 bbl.

### Gas Production

Total gas production was approximately 38,285 M.c.f. Wells in Morgan and Scott counties produced 31,285 M.c.f. and the Jamestown field in Fentress County produced the remainder. Small wells used locally probably would add 2 M.M.c.f. to the above total.


### Acknowledgment

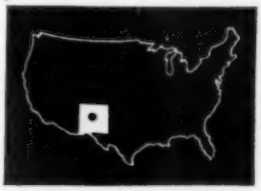
The writer expresses his thanks for the assistance of W. D. Hardeman, state geologist of Tennessee, and for the cooperation of the drillers, operators, and refiners who furnished valuable information.


## Rotary Moving to Las Vegas Test

Bonanza Oil Corp. announced it was moving in a rotary to deepen the 1,348-ft. 1 Government Consolidated at Arden 12 miles southwest of Las Vegas, Nev.

Bonanza formerly used cable tools.

Lady Luck smiles in South Texas



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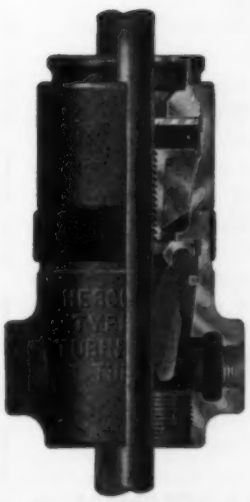
HERCULES TUBING HEADS



"TYPE J-5" TUBING HEAD

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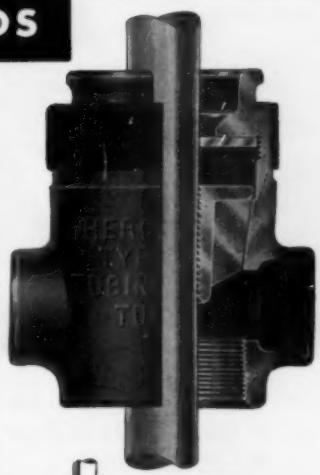
"TYPE J-5-S" STRIPPER TUBING HEAD

The dual purpose "Type J-5-S" Stripper Tubing Head is basically a "Type J-5" Tubing Head with a bowl (top section) screwed into the packing nut thread. The hinged slips, packing and packing nut are installed in the bowl (top section) with the tubing stripper in the body (lower section), thus permitting tubing to be run-in or removed under pressure. Test pressure is the same as the "Type J-5" Tubing Head.



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# Mud brings Canadian drilling to a halt

"KING MUD" invaded western Canada, slowing the oil industry to a pace of a sloth.

Drilling activity ground to a halt in many of the hot exploration areas and, since many of those regions lie in the muskeg country, not too much activity is anticipated until freezeup next fall.

Producing areas serviced by pipeline facilities are more than capable of supplying the lower demand for western Canadian crude and therefore, the shutting in of areas not yet linked to markets by pipelines is an extremely minor irritation.

The big question is: What percentage drop can be expected in activity after the road bans are lifted? This hinges to a great extent on a pending interim report on export of natural gas that is expected late in April from the Dominion Government, based on the recommendation of the Borden Royal Commission. A favorable report to the industry and loosening of the bonds that now tie western Canada's natural gas could go a long way towards alleviating problems of industry firms that have been caused by the crude-oil marketing problems. True, no sudden rush to drill gas-development wells can be expected if export is approved, but with many uncertainties cleared up the necessary planning is likely to react like a wonder drug on the now-ailing industry.

Road-ban conditions in western Canada this year are no worse than in past years, and previous years' experiences have taught oil men how to deal with the occasion. However, this year, with no pressing incentive to develop crude-oil or gas reserves, operations have dropped off quicker than previously and to a greater extent.

It is estimated that 340 drilling rigs are available for work in western Canada and as of the first week in April just 134 remained on the operation list. Many more have been bogged down since and few new drill starts have been recorded. The activity that is still under way to a major extent is confined to Alberta and British Columbia, where 96 and 27 rigs are working respectively.

Saskatchewan has only 15 rigs working, Manitoba 3, and there are also 3 reported active in the Northwest Territories. Early in March there were 253 rigs active in the same region, with 182 active in Alberta, 36 in Saskatchewan, 5 in Manitoba, 27 in British Columbia and 3 in N.W.T.

## California gets dual completion

THE currently busy East Gosford field of Kern County, has been given its first dual completion by Universal Consolidated Oil Co.

The Universal well, 47-13 Statex-KCL, was completed in both the upper and lower Stevens zones making 1,056 bbl. daily. The operator choked back the well to 13/64-in. choke and at last reports the well was producing 240 bbl. daily from the Lower Stevens and 205 bbl. daily from the Upper Stevens. The Upper Stevens is perforated at 7,366-96 ft. and the Lower at 9,145-9,594 ft. Total depth is 9,696 ft.

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*By Kenneth K. Landes, University of Michigan*

This practical work provides useful field data on the occurrence, distribution, and technique of location of gas deposits and oil reservoirs—plus a clear explanation of the theories developed to explain the origin, migration, and accumulation of oil and gas. ". . . deserves commendation," say *Geophysics Magazine,* "for its many fine illustrations . . . ; its wealth of references, which completely document every facet of the discussion and indicate an amazing familiarity with the literature . . . ; and for the informal style of writing which keeps the material interesting in spite of a mass of facts and data that in the hands of a less skilled author would consign the book to dusty references shelves." 1951. 660 pages. $11.00.

THE OIL AND GAS JOURNAL
Reader Service Department
P. O. Box #1260 Tulsa, Oklahoma

# Here's the industry's well-completion count for March in U. S.

| | TOTAL COMPLETIONS | | | | | | | WILDCAT WELLS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Crude | Cond. | Gas | Dry | Service | Footage | Total | Crude | Cond. | Gas | Dry | Footage | C.T. | Act. op. |
| Alabama | 7 | 5 | 0 | 0 | 2 | 0 | 72,601 | 2 | 0 | 0 | 0 | 2 | 13,857 | 0 | 12 |
| Arkansas | 36 | 12 | 0 | 2 | 22 | 0 | 126,395 | 14 | 0 | 0 | 2 | 12 | 54,885 | 0 | 85 |
| California | 105 | 67 | 0 | 0 | 38 | 0 | 598,748 | 25 | 1 | 0 | 0 | 24 | 142,684 | 1 | 137 |
| Colorado | 53 | 12 | 0 | 7 | 34 | 0 | 282,451 | 24 | 1 | 0 | 1 | 22 | 131,689 | 0 | 74 |
| Florida | 2 | 0 | 0 | 0 | 2 | 0 | 18,942 | 2 | 0 | 0 | 0 | 2 | 18,942 | 0 | 0 |
| Illinois | 123 | 52 | 0 | 1 | 69 | 1 | 288,491 | 29 | 0 | 0 | 1 | 28 | 59,791 | 12 | 325 |
| Indiana | 46 | 14 | 0 | 4 | 28 | 0 | 66,612 | 15 | 2 | 0 | 0 | 13 | 25,102 | 35 | 75 |
| Kansas | 317 | 154 | 1 | 21 | 130 | 11 | 1,101,618 | 53 | 10 | 0 | 1 | 42 | 202,258 | 12 | 291 |
| Kentucky | 67 | 21 | 0 | 9 | 36 | 1 | 89,744 | 10 | 1 | 0 | 0 | 9 | 13,262 | 48 | 145 |
| Louisiana | 234 | 120 | 18 | 21 | 75 | 0 | 1,841,111 | 30 | 4 | 1 | 2 | 23 | 265,032 | 0 | 432 |
| North | 93 | 48 | 0 | 17 | 28 | 0 | 331,616 | 12 | 2 | 0 | 2 | 8 | 57,468 | 0 | 168 |
| South | 114 | 57 | 17 | 4 | 36 | 0 | 1,250,879 | 15 | 2 | 1 | 0 | 12 | 175,466 | 0 | 221 |
| Offshore | 27 | 15 | 1 | 0 | 11 | 0 | 258,616 | 3 | 0 | 0 | 0 | 3 | 32,098 | 0 | 43 |
| Michigan | 28 | 10 | 0 | 2 | 16 | 0 | 79,599 | 12 | 0 | 0 | 2 | 10 | 28,669 | 21 | 103 |
| Mississippi | 30 | 10 | 2 | 1 | 17 | 0 | 259,735 | 12 | 1 | 1 | 1 | 9 | 108,161 | 0 | 39 |
| Montana | 20 | 10 | 0 | 1 | 9 | 0 | 139,141 | 6 | 0 | 0 | 1 | 5 | 30,197 | 7 | 43 |
| Nebraska | 54 | 11 | 0 | 0 | 43 | 0 | 316,129 | 25 | 1 | 0 | 0 | 24 | 140,734 | 0 | 28 |
| New Mexico | 133 | 91 | 1 | 20 | 21 | 0 | 624,862 | 14 | 3 | 1 | 0 | 10 | 100,826 | 43 | 192 |
| West | 57 | 32 | 0 | 18 | 7 | 0 | 257,768 | 5 | 3 | 0 | 0 | 2 | 25,899 | 10 | 102 |
| East | 76 | 59 | 1 | 2 | 14 | 0 | 367,094 | 9 | 0 | 1 | 0 | 8 | 74,927 | 33 | 90 |
| New York | 45 | 21 | 0 | 0 | 4 | 20 | 68,062 | 4 | 0 | 0 | 0 | 4 | 13,962 | 45 | 21 |
| North Dakota | 36 | 26 | 0 | 0 | 10 | 0 | 247,744 | 11 | 5 | 0 | 0 | 6 | 76,866 | 0 | 42 |
| Ohio | 69 | 34 | 0 | 22 | 11 | 2 | 175,793 | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 162 |
| Oklahoma | 463 | 228 | 10 | 34 | 168 | 23 | 1,584,489 | 50 | 7 | 0 | 2 | 41 | 193,971 | 90 | 688 |
| Pennsylvania | 7 | 0 | 0 | 2 | 5 | 0 | 41,434 | 3 | 0 | 0 | 1 | 2 | 20,582 | 0 | 48 |
| Tennessee | 3 | 0 | 0 | 0 | 3 | 0 | 2,919 | 2 | 0 | 0 | 0 | 2 | 1,619 | 3 | 2 |
| Texas | 1,248 | 663 | 39 | 67 | 456 | 23 | 5,200,000 | 256 | 22 | 8 | 3 | 223 | 1,153,772 | 101 | 1,052 |
| Dist. 1 | 55 | 23 | 1 | 1 | 30 | 0 | 138,235 | 21 | 0 | 0 | 0 | 21 | 46,940 | 13 | 37 |
| Dist. 2 | 50 | 19 | 6 | 2 | 23 | 0 | 300,414 | 16 | 3 | 2 | 0 | 11 | 97,459 | 0 | 50 |
| Dist. 3 | 85 | 38 | 8 | 2 | 37 | 0 | 546,660 | 17 | 0 | 0 | 0 | 17 | 133,238 | 0 | 81 |
| Dist. 4 | 76 | 20 | 8 | 6 | 42 | 0 | 393,023 | 21 | 0 | 4 | 0 | 17 | 129,141 | 0 | 54 |
| East | 80 | 35 | 4 | 1 | 40 | 0 | 351,679 | 19 | 0 | 1 | 0 | 18 | 88,615 | 0 | 66 |
| Dist. 7-B | 176 | 83 | 0 | 4 | 86 | 3 | 459,835 | 45 | 6 | 0 | 0 | 39 | 127,850 | 20 | 101 |
| West | 360 | 250 | 3 | 7 | 91 | 9 | 1,836,617 | 64 | 7 | 0 | 2 | 55 | 335,491 | 33 | 487 |
| Dist. 9 | 267 | 143 | 0 | 15 | 98 | 11 | 776,807 | 47 | 6 | 0 | 0 | 41 | 147,946 | 35 | 98 |
| Panhandle | 99 | 52 | 9 | 29 | 9 | 0 | 396,730 | 6 | 0 | 1 | 1 | 4 | 47,092 | 0 | 78 |
| Utah | 38 | 26 | 0 | 3 | 9 | 0 | 213,887 | 6 | 0 | 0 | 0 | 6 | 35,858 | 0 | 79 |
| West Virginia | 49 | 7 | 0 | 31 | 11 | 0 | 135,576 | 3 | 0 | 0 | 2 | 1 | 17,744 | 44 | 174 |
| Wyoming | 71 | 39 | 0 | 3 | 29 | 0 | 313,273 | 13 | 0 | 0 | 0 | 13 | 57,520 | 11 | 110 |
| Mar. 1958 | 3,284 | 1,633 | 71 | 251 | 1,248 | 81 | 13,889,356 | 621 | 58 | 11 | 19 | 533 | 2,907,983 | 541 | 4,359 |
| Feb. 1958 | 3,451 | 1,773 | 78 | 269 | 1,257 | 74 | 14,637,118 | 665 | 70 | 9 | 22 | 564 | 3,070,481 | 576 | 4,780 |
| Cum. 1958 | 11,723 | 5,862 | 265 | 882 | 4,462 | 252 | 49,626,647 | 2,353 | 215 | 33 | 89 | 2,016 | 11,016,387 | 1,698 | ..... |
| Cum. 1957 | 13,278 | 6,975 | 89 | 999 | 4,916 | 299 | 54,924,181 | 3,071 | 351 | 27 | 118 | 2,575 | 14,933,657 | ..... | ..... |

D.D.=14: Illinois 4, Colorado 1, Oklahoma 7, Texas (4) 2.

# . . . and in western Canada

| | TOTAL WELLS | | | | | | | WILDCAT WELLS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Oil | Gas | Dry | Service | Footage | Cum. 1958 | Total | Oil | Gas | Dry | Footage | Cum. 1958 |
| Alberta | 163 | 67 | 13 | 70 | 13 | 955,368 | 395 | 77 | 5 | 8 | 64 | 494,741 | 169 |
| Saskatchewan | 53 | 33 | 0 | 20 | 0 | 227,542 | 170 | 18 | 3 | 0 | 15 | 68,269 | 47 |
| Manitoba | 9 | 8 | 0 | 1 | 0 | 19,258 | 35 | 1 | 0 | 0 | 1 | 2,330 | 2 |
| British Columbia | 15 | 1 | 4 | 10 | 0 | 76,785 | 32 | 12 | 1 | 3 | 8 | 55,964 | 25 |
| Western Canada | 240 | 109 | 17 | 101 | 13 | 1,278,953 | 632 | 108 | 9 | 11 | 88 | 621,304 | 243 |

This is Universal's fifth well in the new Lower Stevens pool it discovered late last year. Superior Oil Co. has two wells and Getty Oil Co. one in the new pool. Universal has two rigs going in the play now as does Superior Oil Co. while Shell Oil Co., Union Oil Co. and Hancock Oil Co. have one each.

**Bridge extension completed . . .** Universal Consolidated Oil Co. completed an important extension test on the northeast edge of the Bridge pool area of South Mountain field in Ventura County. The new extension, 1 Harvey Snyder, was completed in 200 ft. of zone above 7,610 ft. making 109 bbl. daily of 33°-gravity crude.

## Rain Delays Test Of Oregon Well

Sunray Mid-Continent Oil Co. has had to delay start of its proposed 10,000-ft. test south of Prineville in Crook County due to bad weather. Crook County, Oregon, because of bad weather.

# How March field wells classified by depth

| | OIL WELLS | | | | | | | | | GAS WELLS | | | | | | | | | DRY HOLES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | A | B | C | D | E | F | G | H | I | A | B | C | D | E | F | G | H | I |
| Alabama | | | | | | | 4 | 1 | | | | | | | | | | | | | 8 | 2 | | | | | |
| Arkansas | | 5 | 2 | 4 | 1 | | | | | | | | | | | | | | 1 | 2 | | | 6 | 2 | | 2 | 1 |
| California | 3 | 13 | 12 | 11 | 8 | 4 | 10 | 5 | | | | | | | | | | | 1 | | | 1 | 10 | | | | |
| Colorado | 1 | | 2 | 1 | 7 | | | | | | | | | 6 | | | | | 1 | | | | | | | | |
| Illinois | 3 | 20 | 27 | 2 | | | | | | | | | | | | | | | 6 | 10 | 25 | | | | | | |
| Indiana | 7 | 4 | 1 | | | | | | | 4 | | | | | | | | | 6 | 7 | 2 | | | | | | |
| Kansas | | 34 | 90 | 17 | 3 | | | | | | 2 | 4 | 8 | 6 | | | | | | 14 | 42 | 29 | 3 | | | | |
| Kentucky | 15 | 4 | 1 | | | | | | | | 5 | 3 | 1 | | | | | | 18 | 7 | 2 | | | | | | |
| Louisiana | 5 | 19 | 16 | 6 | 11 | 24 | 18 | 16 | 1 | 1 | 7 | 1 | | 2 | 5 | 1 | 2 | | 1 | 3 | 11 | 3 | 3 | 9 | 12 | 8 | 2 |
| North | 5 | 17 | 14 | 3 | 7 | | | | | 1 | 7 | 1 | | 2 | 4 | | | | 1 | 3 | 11 | 1 | 1 | 3 | | | |
| South | | 2 | 2 | 3 | 2 | 17 | 13 | 15 | 1 | | | | | | 1 | 1 | 2 | | | | | 1 | | 5 | 9 | 7 | 2 |
| Offshore | | | | | 2 | 7 | 5 | 1 | | | | | | | | | | | | | | 1 | 2 | 1 | 3 | 1 | |
| Michigan | | 2 | 3 | 4 | 1 | | | | | | | | | | | | | | | 3 | 2 | 1 | | | | | |
| Mississippi | | | | 1 | 2 | 2 | 3 | 1 | | | | | | | | | | | | | | | 6 | | 2 | | |
| Montana | | 1 | 1 | | 1 | 7 | | | | | | | | | | | | | | | | | 1 | 3 | | | |
| Nebraska | | | 1 | 1 | 8 | | | | | | | | | | | | | | | | 1 | 1 | 17 | | | | |
| New Mexico | | 5 | 20 | 30 | 28 | 1 | 4 | | | | 7 | 5 | 1 | 7 | | | | | 3 | 3 | | 3 | 1 | | | 1 | |
| West | | | 2 | 2 | 25 | | | | | | 7 | 3 | 1 | 7 | | | | | 2 | 1 | | 1 | 1 | | | | |
| East | | 5 | 18 | 28 | 3 | 1 | 4 | | | | | 2 | | | | | | | 1 | 2 | | 2 | | | | 1 | |
| New York | | 21 | | | | | | | | | | | | | | | | | | | | | | | | | |
| North Dakota | | | 6 | 1 | 2 | 11 | 1 | | | | | | | | | | | | | | 1 | | 1 | 2 | | | |
| Ohio | 5 | 3 | 24 | 2 | | | | | | 6 | 6 | 7 | 3 | | | | | | 2 | 2 | 4 | 3 | | | | | |
| Oklahoma | 32 | 69 | 51 | 29 | 24 | 13 | 3 | | | | 17 | 5 | 3 | 5 | 2 | | | | 35 | 21 | 34 | 12 | 14 | 8 | 1 | | 2 |
| Pennsylvania | | | | | | | | | | | | | | 1 | | | | | | | | | 3 | | | | |
| Tennessee | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | |
| Texas | 53 | 129 | 191 | 81 | 132 | 38 | 13 | 4 | | | 22 | 15 | 5 | 22 | | | | | 36 | 46 | 49 | 41 | 42 | 14 | 2 | 3 | |
| District 1 | 5 | 7 | 7 | 2 | 2 | | | | | | | 1 | | | | | | | 2 | 4 | 2 | 1 | | | | | |
| District 2 | | | 1 | 3 | 8 | 3 | 1 | | | | | 1 | 1 | | | | | | | 1 | 1 | 4 | 3 | 3 | | | |
| District 3 | | 6 | 10 | 5 | 7 | 9 | 1 | | | | | 1 | | 1 | | | | | 2 | | 6 | 1 | 4 | 4 | 2 | 1 | |
| District 4 | | 2 | 6 | 1 | 9 | 2 | | | | | 2 | 1 | 1 | 2 | | | | | 1 | 2 | 8 | 4 | 9 | 1 | | | |
| East | 4 | 8 | 8 | 2 | 13 | | | | | | | | | 1 | | | | | 6 | 1 | 4 | | 9 | 2 | | | |
| District 7-B | 20 | 24 | 16 | 12 | 5 | | | | | | 2 | | 2 | | | | | | 14 | 11 | 7 | 12 | 3 | | | | |
| West | 2 | 14 | 84 | 41 | 68 | 19 | 11 | 4 | | | 1 | 2 | 1 | 1 | | | | | 3 | 4 | 8 | 7 | 8 | 4 | | 2 | |
| District 9 | 22 | 62 | 21 | 15 | 17 | | | | | | | | | 15 | | | | | 8 | 23 | 10 | 11 | 5 | | | | |
| District 10 | | 6 | 38 | | 3 | 5 | | | | | 17 | 9 | | 2 | | | | | | | 3 | 1 | 1 | | | | |
| Utah | | | | | 26 | | | | | | | 1 | | 2 | | | | | | 1 | | | 2 | | | | |
| West Virginia | 1 | 6 | | | | | | | | | 16 | 7 | 6 | | | | | | 1 | 4 | 2 | 3 | | | | | |
| Wyoming | 4 | 7 | 5 | 14 | 8 | 1 | | | | | | | | | | | | | 4 | 1 | 2 | | 6 | 2 | | 1 | |
| **Total United States** | **129** | **342** | **453** | **204** | **262** | **101** | **56** | **27** | **1** | **11** | **82** | **49** | **27** | **51** | **9** | **1** | **2** | | **114** | **125** | **185** | **99** | **115** | **40** | **17** | **15** | **5** |
| Western Canada | | 8 | 6 | 46 | 34 | 6 | | | | | 1 | 2 | 1 | 1 | 1 | | | | | 1 | 2 | 7 | 2 | 1 | | | |
| Alberta | | | 5 | 20 | 31 | 6 | | | | | 1 | 2 | 1 | | 1 | | | | | 1 | 2 | 2 | 1 | | | | |
| Saskatchewan | | | 1 | 26 | 3 | | | | | | | | | | | | | | | | | 5 | | | | | |
| Manitoba | | 8 | | | | | | | | | | | | | | | | | | | | | | | | | |
| British Columbia | | | | | | | | | | | | | | 1 | | | | | | | | | 1 | 1 | | | |

# How March wildcats classified by depth

| | OIL DISCOVERIES | | | | | | | | | GAS DISCOVERIES | | | | | | | | | DRY HOLES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | A | B | C | D | E | F | G | H | I | A | B | C | D | E | F | G | H | I |
| Alabama | | | | | | | | | | | | | | | | | | | | 1 | | | | | 1 | | |
| Arkansas | | | | | | | | | | | | | | 2 | | | | | | 1 | 7 | 3 | 1 | | | | |
| California | | | | | | 1 | | | | | | | | | | | | | 5 | 2 | 3 | 2 | 4 | 4 | 3 | 1 | |
| Colorado | | | | | 1 | | | | | | | | | | 1 | | | | 1 | | | 9 | 10 | 2 | | | |
| Florida | | | | | | | | | | | | | | | | | | | | | | | 1 | | | 1 | |
| Illinois | | | | | | | | | | | | 1 | | | | | | | 6 | 15 | 6 | | 1 | | | | |
| Indiana | 1 | 1 | | | | | | | | | | | | | | | | | 4 | 7 | 2 | | | | | | |
| Kansas | | | 7 | 2 | 1 | | | | | | | | | 1 | | | | | | 4 | 13 | 22 | 3 | | | | |
| Kentucky | 1 | | | | | | | | | | | | | | | | | | 4 | 2 | 3 | | | | | | |
| Louisiana | | | | 2 | | | 1 | 1 | | | | | | | 2 | | | | 2 | | 2 | 1 | 5 | 3 | 5 | 3 | 2 |
| North | | | | 2 | | | | | | | | | | | 2 | | | | 2 | | 2 | 1 | 3 | | | | |
| South | | | | | | | 1 | 1 | | | | | | | | | | | | | | | 1 | 3 | 4 | 2 | 2 |
| Offshore | | | | | | | | | | | | | | | | | | | | | | | 1 | | 1 | 1 | |
| Michigan | | | | | | | | | | | 1 | 1 | | | | | | | 2 | 3 | 4 | 1 | | | | | |
| Mississippi | | | | | | | | 1 | | | | | | 1 | | | | | | | | | 2 | 4 | 3 | | |
| Montana | | | | | | | | | | | | | 1 | | | | | | 1 | 1 | | 1 | | 2 | | | |
| Nebraska | | | | | 1 | | | | | | | | | | | | | | | | | 6 | 18 | | | | |
| New Mexico | | | | | 3 | | | | | | | | | | | | | | | 1 | 1 | 1 | 3 | 3 | | 1 | |
| West | | | | | 3 | | | | | | | | | | | | | | | 1 | | | 1 | | | | |
| East | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 2 | 3 | | 1 | |
| New York | | | | | | | | | | | | | | | | | | | | | | 4 | | | | | |
| North Dakota | | | | 1 | 2 | 2 | | | | | | | | | | | | | | | 1 | | 2 | 3 | | | |
| Oklahoma | | | 2 | 1 | 2 | | 2 | | | 1 | | | | 1 | | | | | 14 | 5 | 8 | 4 | 6 | 4 | | | |
| Pennsylvania | | | | | | | | | | | | | | | 1 | | | | | | | | 2 | | | | |
| Tennessee | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | |
| Texas | 2 | 5 | 1 | 5 | 7 | 1 | 1 | | | | | | | | 1 | | 1 | 1 | 19 | 56 | 29 | 39 | 48 | 23 | 5 | 3 | 1 |
| District 1 | | | | | | | | | | | | | | | | | | | 7 | 7 | 2 | 3 | 2 | | | | |
| District 2 | | | | | 2 | 1 | | | | | | | | | | | | | | | 2 | 3 | 3 | 3 | | | |
| District 3 | | | | | | | | | | | | | | | | | | | | | | | 3 | 11 | 2 | | 1 |
| District 4 | | | | | | | | | | | | | | | | | | | | 2 | 3 | 3 | 5 | 3 | 1 | | |
| East | | | | | | | | | | | | | | | | | | | | 4 | 1 | 5 | 7 | 1 | | | |
| District 7-B | | 3 | 1 | 1 | 1 | | | | | | | | | | | | | | 8 | 12 | 9 | 5 | 5 | | | | |
| West | 1 | 1 | | 3 | 1 | | 1 | | | | | | | | | | 1 | 1 | 2 | 10 | 5 | 13 | 17 | 3 | 2 | 3 | |
| District 9 | 1 | 1 | | 1 | 3 | | | | | | | | | | | | | | 2 | 21 | 7 | 7 | 4 | | | | |
| District 10 | | | | | | | | | | | | | | | 1 | | | | | | | | 2 | 2 | | | |
| Utah | | | | | | | | | | | | | | | | | | | | 1 | | | 3 | 2 | | | |
| West Virginia | | | | | | | | | | | | | | 2 | | | | | | | | | 1 | | | | |
| Wyoming | | | | | | | | | | | | | | | | | | | 1 | | 3 | 3 | 6 | | | | |
| **Total United States** | **4** | **6** | **10** | **11** | **17** | **4** | **4** | **2** | | **1** | **1** | **2** | **1** | **7** | **5** | | **1** | **1** | **61** | **99** | **82** | **96** | **116** | **50** | **17** | **9** | **3** |
| Western Canada | | | 3 | 1 | 2 | 2 | 1 | | | | | 1 | | 5 | 2 | 1 | 2 | | 2 | 9 | 17 | 15 | 25 | 13 | 7 | | |
| Alberta | | | 1 | | 1 | 2 | 1 | | | | | | | 3 | 2 | 1 | 2 | | 1 | 3 | 12 | 10 | 18 | 13 | 7 | | |
| Saskatchewan | | | 2 | | 1 | | | | | | | | | | | | | | 1 | 4 | 4 | 2 | 4 | | | | |
| Manitoba | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | |
| British Columbia | | | | 1 | | | | | | | | 1 | | 2 | | | | | | 1 | 1 | 3 | 3 | | | | |

**SERVICE-WELL DEPTH BREAKDOWN—MARCH 1958**

| | A | B | C | D | E |
|---|---|---|---|---|---|
| Illinois | .... | 1 | .... | .... | .... |
| Kansas | .... | 1 | 3 | 7 | .... |
| Kentucky | 1 | .... | .... | .... | .... |
| New York | .... | 20 | .... | .... | .... |
| Ohio | .... | 1 | 1 | .... | .... |
| Oklahoma | 3 | 5 | 10 | 4 | 1 |
| Texas | 2 | 12 | 5 | 4 | .... |
| District 7-B | .... | 1 | .... | 2 | .... |
| West | .... | 3 | 4 | 2 | .... |
| District 9 | 2 | 8 | 1 | .... | .... |
| Total United States | 6 | 40 | 19 | 15 | 1 |

**FIELD CONDENSATE-WELL DEPTH BREAKDOWN—MARCH 1958**

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| Kansas | .... | .... | .... | 1 | .... | .... | .... | .... |
| Louisiana | .... | .... | .... | .... | .... | 2 | 8 | 7 |
| South | .... | .... | .... | .... | .... | 2 | 8 | 6 |
| Offshore | .... | .... | .... | .... | .... | .... | .... | 1 |
| Mississippi | .... | .... | .... | .... | .... | 1 | .... | .... |
| Oklahoma | .... | .... | .... | 2 | 2 | 3 | 3 | .... |
| Texas | .... | .... | 1 | 1 | 4 | 14 | 11 | .... |
| District 1 | .... | .... | .... | .... | .... | 1 | .... | .... |
| District 2 | .... | .... | 1 | .... | .... | 2 | 1 | .... |
| District 3 | .... | .... | .... | .... | .... | 2 | 6 | .... |
| District 4 | .... | .... | .... | .... | 1 | 2 | 1 | .... |
| East | .... | .... | .... | 1 | .... | 2 | .... | .... |
| West | .... | .... | .... | .... | 1 | .... | 2 | .... |
| District 10 | .... | .... | .... | .... | 2 | 5 | 1 | .... |
| Total United States | .... | .... | 1 | 4 | 6 | 20 | 22 | 7 |

**WILDCAT CONDENSATE-WELL DEPTH BREAKDOWN—MARCH 1958**

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| Louisiana | .... | .... | .... | .... | .... | .... | .... | .... | 1 |
| South | .... | .... | .... | .... | .... | .... | .... | .... | 1 |
| Mississippi | .... | .... | .... | .... | .... | 1 | .... | .... | .... |
| New Mexico | .... | .... | .... | .... | .... | .... | .... | .... | 1 |
| East | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Texas | .... | .... | .... | 1 | 1 | 5 | 1 | .... | .... |
| District 2 | .... | .... | .... | 1 | .... | 1 | .... | .... | .... |
| District 4 | .... | .... | .... | .... | 1 | 2 | 1 | .... | .... |
| East | .... | .... | .... | .... | .... | 1 | .... | .... | .... |
| District 10 | .... | .... | .... | .... | .... | 1 | .... | .... | .... |
| Total United States | .... | .... | .... | 1 | 1 | 6 | 1 | .... | 2 |

## Shell Gets Two More Good Wells at Saticoy

Shell Oil Co. continued its record of turning up excellent producers in the Saticoy field of Ventura County by bringing in two wells there recently.

In SE SE 30-3n-21w, virtually the center of the long, thin field, Shell brought in 13 Edwards for 400 bbl. daily through an 18/64-in. choke from an interval at 6,616-7,840 ft. About ½ mile southwest of 13 Edwards, the operator in the same week completed 16 Edwards flowing 773 bbl. daily through a 24/64-in. choke from perforations at 7,156-7,477 ft.

The operator originally took 13 Edwards to 12,275 ft., total depth, before plugging back to 7,885 ft. for completion in the regular Pliocene zone of the Oakridge Fault.

## New Desert Wildcat Slated for Drilling

Fairmont Exploration Co. was moving in equipment to drill a 1,500-ft. wildcat in Antelope Valley about 18 miles west of the Mojave Desert community to Lancaster in Los Angeles County. Elevation is 2,670 ft. at the drill site which is just 1 mile from the Kern County line.

In the Lancaster area itself, Cedric E. Brown reported he was planning to resume operations on his 2 well where work was rained out this winter. Despite its shallow depth of only 3,000 ft., this is one of the longest drilling projects currently active in the state. It was spudded in October 3, 1956, and has seen almost continuous operations of some sort since that date.

The only other desert test still active is Flamingo Oil Co.'s 1 Flamingo near Needles on the Arizona border. Flamingo was cleaning out the 2,203-ft. hole preparatory to resuming drilling.

## Test Set for Kentucky

In Carter County about 5 miles northwest of Grayson, the county seat, Ralph Thomas, et al is drilling at 3,255 ft. on 1 Jim Simmons, a rank wildcat for this area of eastern Kentucky. Formation being drilled is tentatively designated as Tyrone limestone of Ordovician age. Test is planned to evaluate the St. Peter sandstone expected at 3,450 ft. and the underlying Knox dolomite, both formations being Cambro-Ordovician age.

# Two new fields found in Louisiana

DISCOVERY of two new fields was reported last week in Central Louisiana's Vermilion Parish.

One, found by Union Oil Co. of California, is in the coastal marshland area west of Vermilion Bay. The other, opened by Charles B. Wrightsman, of Houston, is in the far-northern part, near the Acadia Parish line.

Union's discovery well, 1-F Louisiana Furs, Inc., in 4-16s-2e, flowed at the rate of 357 bbl. of 48.3°-gravity condensate with 4,425 M.c.f. of gas per day. Its pay is perforated at 13,310-20 ft. Hole was drilled to 14,570 ft. Nearest other production is in Fresh Water Bayou field, 4 miles south.

Wrightsman's new well, 1 Petry, in 6-11s-2e, is rated at 288 bbl. of clean 32.4°-gravity oil per day, flowing through small chokes. Gas-oil ratio is 729 cu. ft. per barrel, and flowing pressure 1,480 psi. Its location is 2 miles north of Leleaux field, and about 3 miles south of the South Crowley area, in southern Acadia Parish.

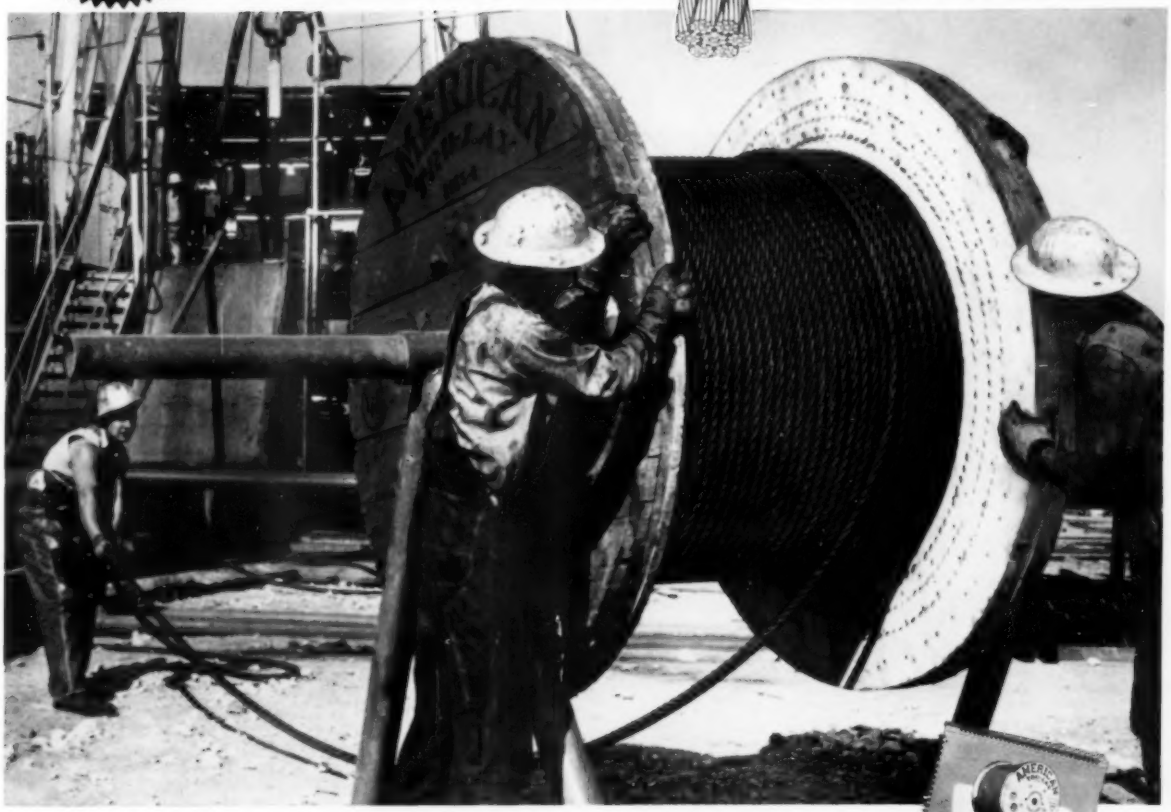
## Louisiana's Bastian Bay Extended Southeast

The spreading deep Bastian Bay area in the delta marshes of Plaquemines Parish, southeastern Louisiana, received another major extension last week with a new gas-condensate discovery by Tidewater Oil Co. 4 miles southeast of the main part of the field.

The new discovery, on State Lease 192, tested a gas flow of 4,700 M.c.f. of gas per day through 7/32-in. choke. Flowing pressure gaged 4,375 psi. Liquid content was not estimated. Gravity of the liquid in samples recovered was 45.8°.

for Better Value

# American Cable VHS®



## This 3-point control program will give you longer, safer rotary line life...

Stop guessing about how much service and safety you can expect from rotary drilling lines! Follow a definite line control program that is tailor-made to meet the specific requirements of your operation. More and more drillers are finding they can cut costs and get record breaking Ton-Mile performance from lines by following this simple 3-Point Control Program.

**1. Use Only Tru-Lay VHS Lines.** Made from a new grade of rope wire developed by ACCO's own process, VHS has 15% greater tensile strength than Improved Plow Steel. Also tougher and more wear resistant, VHS delivers more Ton-Mile service while resisting abrasion. And you can count on this great new rope to give you the highest safety factor available . . . a mighty important advantage at any depth . . . but especially at 10,000 ft. or below!

**2. Buy Tru-Lay VHS in the longest practical length.** Thus, with ample line reserve, cut-offs can be averaged-out to economically distribute wear and fatigue throughout the entire line.

**3. Follow A Definite Cut-Off Schedule.** Because practices vary from rig to rig, it is vital for you to follow a cut-off schedule that's right for your particular lines. For help in selecting your own cut-off practice, call our nearest field man. He'll give you expert advice . . . and will leave a Ton-Mile Record Book to help carry out his recommendations. You can get TRU-LAY VHS drilling lines—in the length and diameter you need—from stock at the stores of Mid-Continent Supply Company.

**American Cable Division**
**AMERICAN CHAIN & CABLE**

Bridgeport, Conn.
Factories at Wilkes-Barre, Pa., and Houston, Texas

ACCO
TRADE MARK

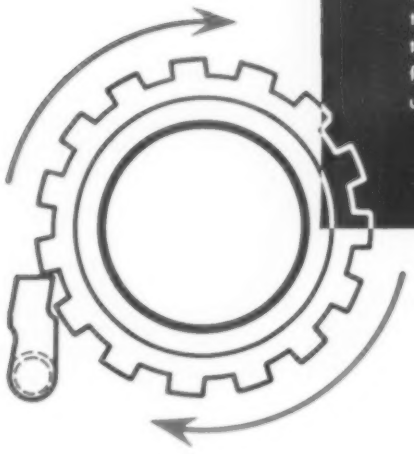
# *Now for the first time in the Oil Field*

## *A valve for* W. O. G. M.* *Service* • • •

During a research program, Cameron engineers subjected every type of conventional valve to wear by opening and closing against high pressure abrasive flow. In the course of these tests it developed that the downstream seat on each valve showed the most wear, whereas other sealing surfaces in the valves were relatively undamaged.

Maximum wear always occurred at the same point on the seat. Then a new idea was conceived. Rotating the seat a fraction of a turn each time the valve was opened and closed would present a new surface at the point of greatest wear each time the valve was operated. This principle is the central feature of the new Cameron Type "F" gate valve.

The same carefully controlled tests which produced such destructive wear on the conventional valves were re-run with the Type "F" gate valve. The remarkable results exceeded every expectation. Here for the first time is a valve with such unusual durability that it can perform any W.O.G.M.* service for many times the life span of any valve used in drilling and production service.



Cameron

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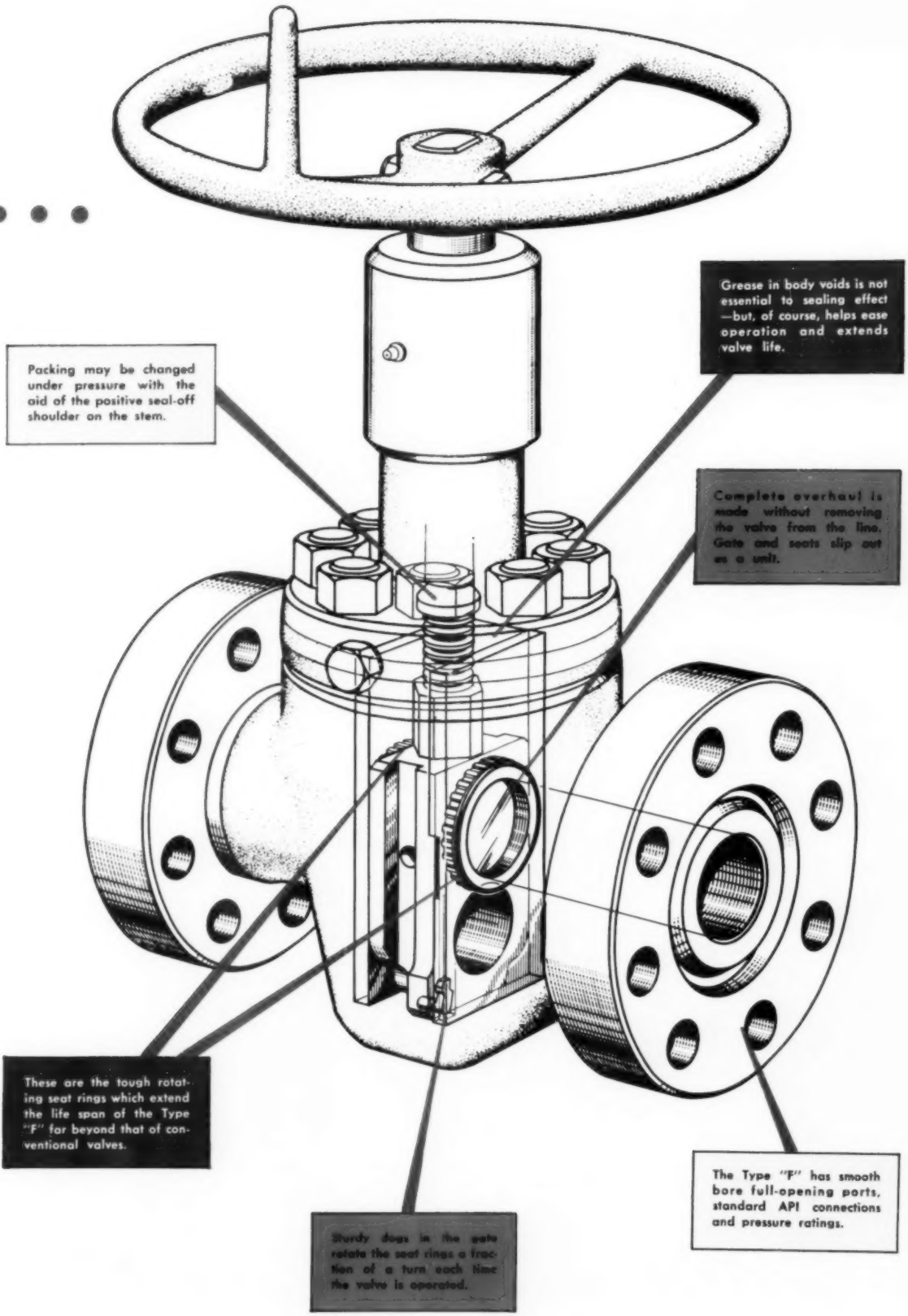
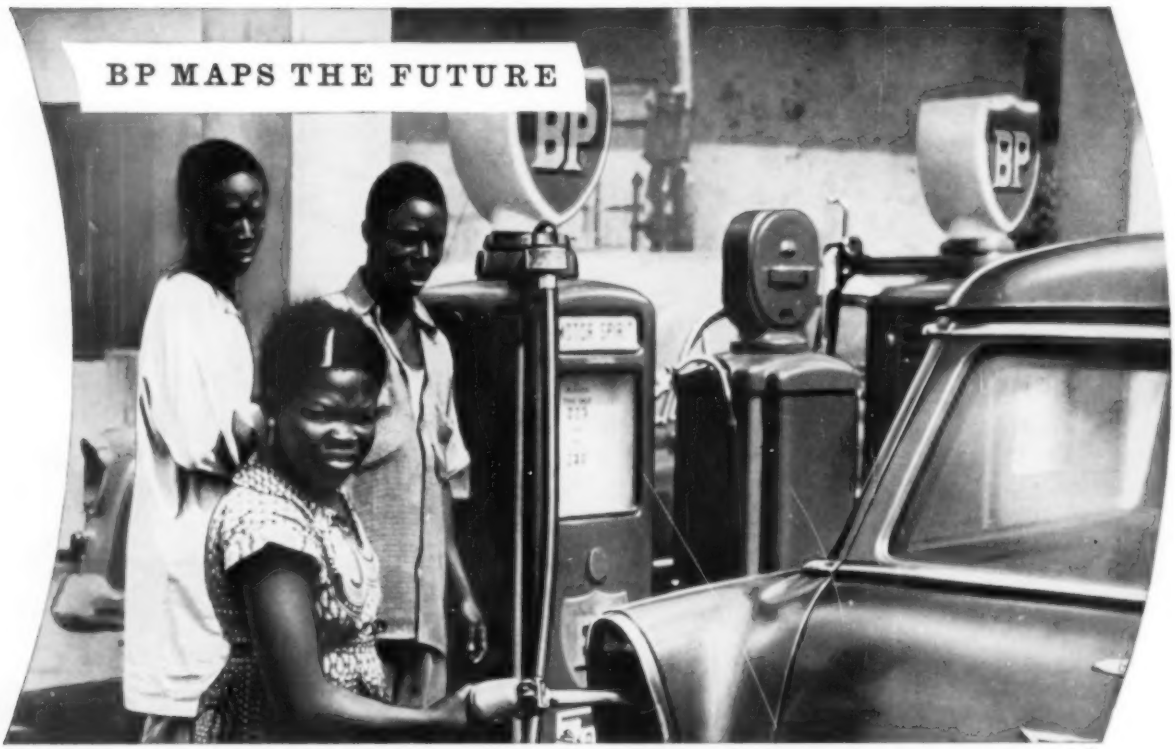
**Water Oil Gas Mud*


Packing may be changed under pressure with the aid of the positive seal-off shoulder on the stem.
Grease in body voids is not essential to sealing effect —but, of course, helps ease operation and extends valve life.
Complete overhaul is made without removing the valve from the line. Gate and seats slip out as a unit.
These are the tough rotating seat rings which extend the life span of the Type "F" far beyond that of conventional valves.
The Type "F" has smooth bore full-opening ports, standard API connections and pressure ratings.
Sturdy dogs in the gate rotate the seat rings a fraction of a turn each time the valve is operated.

*Pressure Ratings through 15,000 p.s.i. W.P.*




The British Petroleum Company is establishing hundreds of service stations, and training local talent to operate them in West Africa, where twice as many motorists are now fuelling at BP stations as three years ago.

# West Africa on Wheels

IN AN AREA larger than Europe – where one's next door neighbour may live hundreds of miles away – roads are West Africa's vital arteries, and petrol its life blood. Anyone who helps transport along in West Africa to-day is contributing in a vital way to its economic and cultural future.

Operating in more than twenty West African countries, whose combined area exceeds 5,000,000 square miles, BP is making three great contributions to transport development: by supplying petrol and lubricating oils that withstand the extremes of West African weather; by steadily extending its network of service stations; by training local talent to operate them safely and skilfully.

Oil is helping to raise West Africa's standards of living and will increasingly do so. There, as elsewhere throughout the world, The British Petroleum Company is speeding the wheels of progress.

THE *British Petroleum*
COMPANY LIMITED

BP

# Exploration pays off

## in Texas . . .

A WILDCAT 5 miles west of Garwood, in southwestern Colorado County, Texas Gulf Coast, is proving productive in at least two Yegua zones to open another oil and gas-condensate field.

The new discovery is by Robert Mosbacher and W. T. Mendell-Harkins & Co., of Houston, at their 1 Lehrer, completed with perforations at 6,242-47 ft., in the lower Yegua, and 5,857-64 ft., in the upper Yegua. Total depth is 10,526 ft.

Production from the lower zone is clean oil, flowing 5 bbl. per hour through 3/32-in. choke under pressure of 1,200 psi.

Flow from the upper zone was at the rate of 1,250 M.c.f. of gas per day, through ⅛-in. choke, with liquid recovery of 20 bbl. of condensate per 1 M.M.c.f. of gas.

Location is about midway between Buck-Snag and Mustang fields, being about 1½ miles northwest of the former.

## in Wyoming . . .

WYOMING'S Wind River basin is gaining momentum as a busy province this spring. Important wildcat happenings in this complex basin include a confirmation well to Lost Cabin field and drilling of another extension try to West Lysite field, both in Fremont County.

The California Co. is below 3,180 ft. at 1 Government in C SW NW 10-38n-90w as a confirmation to the 1 Spratt discovery, one of 1957's exploratory highlights in the Rockies. That well flowed 8,275 M.c.f. of gas daily from two Upper Cretaceous zones. This discovery is on the north fringe of the highly faulted and complex Wind River basin.

In the West Lysite area, 5½ miles west of Lost Cabin, the same company is drilling below 9,185 ft. at 1 State in NW NE SE 4-38n-91w. This one will go to the Mesaverde at about 12,000 ft.

## in Michigan . . .

ENCOURAGEMENT for expanded development in St. Clair County will follow Glen Mills 1 Baumgarten, W½ SE NW 22-4n-15e, Casco Township, which gaged 5,200 M.c.f. of gas from Salina A-1 dolomite at 2,356 to 2,400 ft.

A smaller gas well was drilled in 1956 ½ mile northeast by Panhandle Eastern Pipe Line Co., chief acreage holder in the area. Last year Mills drilled a 70-bbl. Niagaran oil well to 2,600 ft. on the offset.

• Deepened from 1,963 to 2,005 ft., Lowell Bernhardts 1 Kain, NE NW NW 30-7s-6e, Monroe County, logged 1,900 ft. oil in Trenton from 1,956 to 2,000 ft. Wildcat is located 4 miles south of old Deerfield oil pool. Test will be acidized for completion.

## in the San Juan basin . . .

THE SAN JUAN BASIN'S new Gallegos-Gallup trend is growing. Gages on six producers in this area were reported last week by El Paso Natural Gas Products Co.

The Gallup wells are all flowing oil producers. The 1 Eddy in C SE SW 33-27n-12w, flowed 21 bbl. daily; the 2 Western-A made 193 bbl. daily.

The other four wells flowed oil from 21 to 193 bbl. per day. Four new wells were also located in this fast-growing Gallup trend which is located between Bisti and Blanco. Frontier Refining Co. will drill the four new wells.

## and in Pennsylvania

BOTH gas and oil were discovered at a wildcat in Crawford County, northwestern Pennsylvania. The discovery well is Felmont 1 Forre, about 6 miles southeast of Benedum-Trees' famous Ashtabula, Ohio, discovery.

Felmont's well is producing from the Grimsby sands of Medina-Lower Silurian age. The well made 25 bbl. of oil per day and 300 M.c.f. of gas.

## Wildcat Slated for Wyoming's Lodgepole

The Lodgepole area of Weston County in the Powder River basin of Wyoming will get a 6,850-ft. Dakota-Cretaceous wildcat.

True Oil Co. will drill A-1 Government in C SE NW 18-44n-66w, 1½ miles southwest of a recent discovery at Tennessee Gas Transmission Co. 1 Long-Davis in C SE NW 8-44n-66w.

That well pumped 99 bbl. of oil daily from the Dakota at 6,811-18 ft.

## Abandoned Texas Gas Area Produces Oil

THE OLD shallow Adams-Medina gas area in southern Medina County, Southwest Texas, is being revived with an oil discovery in a new shallow Navarro sand. Gas production, now abandoned, has been from the Navarro-Taylor contact between 850 and 1,050 ft.

The new Navarro oil sand is at 400 ft. Its discovery well, drilled by Carlton W. Adams, Jr., of Devine, Tex., has the pay at 382-87 ft. Completion is on the pump for 11 bbl. of clean 22°-gravity oil per day.

The well, 1-A, is on land owned by the Adams family. The second well, confirming the discovery, is producing from the pay at 433-44 ft.

The discovery is about 12 miles west of Devine, and on the northeastern flank of the old gas-productive area. Nearest comparable production is in Chicon Lake field, 15 miles northeast.

## Gas-Condensate Find Revives Texas Field

A gas-condensate discovery by Hillcrest Oil Co. about 14 miles southwest of Falfurrias, in northwestern Brooks County, Southwest Texas, revives the Bob Cooper area, whose one well, completed in 1955, no longer is on production.

Hillcrest's well, 2 Jack Casey, is rated good for 12 M.M.c.f. of gas daily from a Frio sand perforated at 5,842-43 ft. Liquid recovery is 10 bbl. per 1 M.M.c.f. of gas. Bottomhole pressure at 5,725 ft. was 2,695 psi. Hole was drilled to 6,258 ft.

Location is about ½ mile southwest of the area's discovery well, drilled by Bridwell Oil Co. That well, 1 Casey, was completed as a 123-bbl. oil producer from a 5,660-ft. Frio pay.

# How March drilling compared in footage

| | FIELD WELLS | | | | | WILDCAT WELLS | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Oil | Cond. | Gas | Dry | Service | Oil | Cond. | Gas | Dry |
| Alabama | 58,744 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 13,857 |
| Arkansas | 38,922 | ..... | ..... | 32,588 | ..... | ..... | ..... | 10,684 | 44,201 |
| California | 356,184 | ..... | 6,650 | 99,880 | ..... | 8,700 | ..... | ..... | 133,984 |
| Colorado | 51,481 | ..... | 34,814 | 64,467 | ..... | 7,126 | ..... | 8,033 | 116,530 |
| Florida | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 18,942 |
| Illinois | 129,323 | ..... | ..... | 97,551 | 1,826 | ..... | ..... | 2,932 | 56,859 |
| Indiana | 15,208 | ..... | 3,413 | 22,889 | ..... | 3,323 | ..... | ..... | 21,779 |
| Kansas | 460,701 | 4,818 | 88,277 | 304,638 | 40,926 | 37,225 | ..... | 5,705 | 159,328 |
| Kentucky | 20,717 | ..... | 22,647 | 32,465 | 653 | 395 | ..... | ..... | 12,867 |
| Louisiana | 837,611 | 204,107 | 108,529 | 425,832 | ..... | 34,631 | 17,200 | 16,733 | 196,468 |
| North | 137,868 | ..... | 62,525 | 73,755 | ..... | 9,572 | ..... | 16,733 | 31,163 |
| South | 558,825 | 190,734 | 46,004 | 279,850 | ..... | 25,059 | 17,200 | ..... | 133,207 |
| Offshore | 140,918 | 13,373 | ..... | 72,227 | ..... | ..... | ..... | ..... | 32,098 |
| Michigan | 34,918 | ..... | ..... | 16,012 | ..... | ..... | ..... | 4,900 | 23,769 |
| Mississippi | 83,213 | 8,450 | ..... | 59,911 | ..... | 12,789 | 9,715 | 5,137 | 80,520 |
| Montana | 76,239 | ..... | ..... | 32,705 | ..... | ..... | ..... | 4,041 | 26,156 |
| Nebraska | 56,975 | ..... | ..... | 118,420 | ..... | 6,210 | ..... | ..... | 134,524 |
| New Mexico | 404,769 | ..... | 76,921 | 42,346 | ..... | 17,833 | 17,555 | ..... | 65,438 |
| West | 147,687 | ..... | 69,566 | 14,616 | ..... | 17,833 | ..... | ..... | 8,066 |
| East | 257,082 | ..... | 7,355 | 27,730 | ..... | ..... | 17,555 | ..... | 57,372 |
| New York | 27,050 | ..... | ..... | ..... | 27,050 | ..... | ..... | ..... | 13,962 |
| North Dakota | 144,694 | ..... | ..... | 26,184 | ..... | 35,078 | ..... | ..... | 41,788 |
| Ohio | 90,338 | ..... | 51,329 | 29,179 | 4,947 | ..... | ..... | ..... | ..... |
| Oklahoma | 717,439 | 80,828 | 108,388 | 418,716 | 65,147 | 45,505 | ..... | 6,052 | 142,414 |
| Pennsylvania | ..... | ..... | 6,955 | 13,897 | ..... | ..... | ..... | 8,152 | 12,430 |
| Tennessee | ..... | ..... | ..... | 1,300 | ..... | ..... | ..... | ..... | 1,619 |
| Texas | 2,597,589 | 270,777 | 247,463 | 875,482 | 54,917 | 99,537 | 66,763 | 36,898 | 950,574 |
| Dist. 1 | 58,724 | 8,215 | 2,990 | 21,366 | ..... | ..... | ..... | ..... | 46,940 |
| Dist. 2 | 99,499 | 30,886 | 7,510 | 65,060 | ..... | 20,544 | 13,395 | ..... | 63,520 |
| Dist. 3 | 199,908 | 83,907 | 9,906 | 119,701 | ..... | ..... | ..... | ..... | 133,238 |
| Dist. 4 | 98,805 | 32,976 | 22,621 | 109,480 | ..... | 114 | 35,280 | ..... | 93,747 |
| East | 143,004 | 22,427 | 6,001 | 91,632 | ..... | ..... | 9,224 | ..... | 79,391 |
| Dist. 7-B | 189,821 | ..... | 11,019 | 122,048 | 9,097 | 18,464 | ..... | ..... | 109,386 |
| West | 1,256,076 | 28,893 | 19,182 | 171,258 | 25,717 | 35,150 | ..... | 28,928 | 271,413 |
| Dist. 9 | 362,240 | ..... | 92,393 | 154,125 | 20,103 | 25,265 | ..... | ..... | 122,681 |
| Dist. 10 | 189,512 | 63,473 | 75,841 | 20,812 | ..... | ..... | 8,864 | 7,970 | 30,258 |
| Utah | 149,639 | ..... | 14,413 | 13,977 | ..... | ..... | ..... | ..... | 35,858 |
| West Virginia | 13,272 | ..... | 78,013 | 26,547 | ..... | ..... | ..... | 12,600 | 5,144 |
| Wyoming | 153,737 | ..... | 20,307 | 81,709 | ..... | ..... | ..... | ..... | 57,520 |
| **Total United States** | **6,518,763** | **568,980** | **861,469** | **2,836,695** | **195,466** | **308,352** | **111,233** | **121,867** | **2,366,531** |
| Western Canada | 499,918 | ..... | 26,892 | 60,170 | 70,669 | 55,528 | ..... | 86,116 | 479,660 |
| Alberta | 344,368 | ..... | 21,645 | 23,945 | 70,669 | 38,321 | ..... | 70,822 | 385,598 |
| Saskatchewan | 138,622 | ..... | ..... | 20,651 | ..... | 12,523 | ..... | ..... | 55,746 |
| Manitoba | 16,928 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2,330 |
| British Columbia | ..... | ..... | 5,247 | 15,574 | ..... | 4,684 | ..... | 15,294 | 35,986 |

## Hugoton sprouts Mississippian pool

A PROLIFIC Mississippian oil pool was opened officially in southwestern Kansas' Hugoton gas field. The new inside-Hugoton pre-Permian strike is White Eagle Oil Co. 1 Eubank, NW¼ NW¼ 28-28s-34w, Haskell County.

On official potential test the well flowed oil at the daily rate of 502 bbl. on ½-in. choke from perforations in the Chester sand at 5,439-45 ft. Total depth is 5,692 ft.

The new pool is 8 miles south of Pleasant Prairie pool, a Finney County - Haskell County line producer. White Eagle has drilled 15 oil wells in Pleasant Prairie field with no dry holes over a 5-mile span wholly contained in the company's 25,000-acre block.

Oil production is from the Mississippian at 5,100 ft. and underlies Permian gas production within Hugoton field itself.

## *Successful Wildcats*

### ALABAMA

Mobile County: Magnolia Petroleum Co. 1-A School Land, C NE NW 16-1n-2w. IPP 116 BOPD, 44°, GOR 200 cu. ft. per barrel, perforations 10,875-94 ft., 10,897-10,907 ft., 10,913-30 ft., 10,935-49 ft., 11,055-67 ft., 11,070-78 ft. (stringer Rodessa sands). TD 11,800 ft., Lower Cretaceous 7,560 ft., base anhydrite 10,872 ft. Pine Island 11,452 ft. (Extends Citronelle field 1½ miles southeast.)

### ALBERTA

York et al 1-27-36-28 Penhold, LSD 1, 27-36-28w4. Basal Blairmore oil well. TD 8,535 ft.

California-Standard Co. - British American 10-33-63-10 Iosegun. LSD 10, 33-63-19w5. Beaverhill Lake oil well. TD 9,985 ft.

Pure-TPC&O 6-7-74-16 High Prairie, LSD 6, 7-74-16w5. Capped gas well. TD 7,744 ft.

### SASKATCHEWAN

Consumers' Co-op 6-2 Souris River, LSD 6, 2-2-5w2. Midale oil discovery. TD 5,296 ft.

Imperial 3-33-3-2 Oxbow, LSD 3, 33-3-2w2. Mission Canyon oil discovery. TD 4,440 ft.

### BRITISH COLUMBIA

Phillips A-1 Town, 69-J-94-B-16. Mississippian gas discovery. TD 7,400 ft.

Gulf 1 Clarke Lake, 88-L-94-J-9. Slave Point gas discovery. TD 6,438 ft.

**NEW** BA President E. D. Brockett, left, and Board Chairman M. S. Beringer.

# Gulf's Brockett Moves to BA

## . . . to direct expanding Canadian operations. Promotions come fast for the youthful production expert from Texas.

A ROUSTABOUT, engineer, war hero, and rapidly rising oil company executive has taken over, at the age of 45, as president of British American Oil Co., Ltd.

E. D. Brockett, a Texan who has spread his talents from South America to the far Pacific and now to Canada, is moving into the British American job from a vice presidency of Gulf Oil Corp., the BA parent.

Brockett succeeds M. S. Beringer, who is retiring as president but remains as chairman of the BA board.

Except for his 5 years with the U. S. Army in World War II, Brockett has been a Gulf man since graduation from Texas A. & M. in 1934 as a petroleum engineer. He was born in Itasca, Tex., attended schools in Fort Worth.

As a roustabout and roughneck for Gulf, Brockett has learned the oil business from the derrick floor on up. He became a production engineer at Odessa in 1936 and held the job until called into service in late 1940.

During 1942 he had an oil assignment in New Zealand as contracting officer for the Corps of Engineers working with Superior Oil Co. But soon he was moved into the Engineer Amphibious Command and assigned to the Second Engineers Special Brigade, which made military history in such places as New Guinea, Buna, Finschhafen Gulf, Hollandia, and Leyte.

He flew into Tokyo with the first occupation forces.

For his valor and proficient service, Brockett won the Distinguished Service Order of Australia, Legion of Merit, Silver Star with cluster, Air Medal, and Presidential Citation. He gained the Purple Heart for wounds received at Leyte. He was discharged a colonel.

**Moved up fast . . .** Back in the harness at Gulf after the war, Brockett became a staff engineer in the Fort Worth division, rose to assistant superintendent of production in 1948, and was transferred in 1949 to the Pittsburgh general offices as staff engineer in production.

Three years later Brockett won an important promotion. He was sent to Gulf's Venezuelan subsidiary, Mene Grande Oil Co., where he became assistant president and production manager.

Then, in 1955, Brockett returned to the U. S. as a vice president for Gulf —at the age of 41. First he was placed in charge of the Houston production division and then was transferred last June to Pittsburgh as coordinator of all Gulf production throughout the world.

From this job he moves into the presidency of British American at Toronto to direct BA's expanding operations in Canada.

**At home . . .** Brockett is married to the former Frances Sammons of Fort Worth. They have two childern, Belmont, 20, a student at Thiel College, Greenville, Pa., and Janet, 6.

The new BA president is an expert golfer in his off-duty hours. When he can play regularly, he shoots in the high 70's.

**Other changes . . .** In addition to naming Brockett as president, the British American directors reelected Beringer as board chairman, a post he has held since 1951. He had been president since 1955. Beringer has spent more than 40 years in the oil industry and joined BA in 1934.

The directors also named a new vice president, J. W. Morgan, formerly manager of BA's manufacturing; and a new treasurer, J. R. Yarnell, formerly services manager for BA's production department in Calgary and assistant secretary. Both are natives of Canada.

D. L. Campbell and E. D. Loughney were reappointed as senior vice presidents.

**John T. Sample, Jr.,** geologist, has been transferred to Midland, Tex., from Amarillo, Tex., by Seaboard Oil Co.

**Philip G. Dolbow** has been named junior engineer in Sohio Petroleum Co.'s Oklahoma City division office. He has been on a year's training program with Sohio.

**Glen C. Sleight,** formerly Michigan district geologist for Sun Oil Co., has been transferred to Evansville, Ind., as assistant division geologist in the company's new eastern production division.

**Dr. Edward W. Hard** has moved up from regional geologist in Dallas for Sun Oil Co., to geophysical coordinator. He succeeds **Lee Smith,** who was recently transferred to Caracas with Venezuelan Sun Oil Co., a subsidiary. **Ross H. Ley,** Midland, Tex., district geologist, will transfer to Dallas as regional geologist. **Fred Smyth,** assistant district geologist in Midland, will replace Ley as district geologist there. **John Means,** assistant division paleontologist in Richardson, Tex., has been named division paleontologist, succeeding the late Dr. I. B. Hamilton.

## Personals

**W. M. Vaughey,** partner in Vaughey & Vaughey, Jackson, Miss., independent oil firm, has been elected vice president of the Deposit Guaranty Bank & Trust Co. of Jackson and will head its new petroleum department. He has been a director and chairman of the oil-loan committee of the bank since 1949. Vaughey is a past president of the Independent Petroleum Association of America, and is a director of the American Petroleum Institute and the Mid-Continent Oil and Gas Association. He will remain active as an independent oil operator.

**Bill J. McMichael,** geologist with Ohio Oil Co., has been transferred to Roswell, N. M., from Abilene, Tex.

**Don F. Weber** and **Merlin W. Jones** have joined Petroleum, Inc., in Wichita as geologists. Both are recent graduates of the University of Wichita.

**Joe E. Sigmund,** geologist with The California Co. in Jackson, Miss., has been transferred to Bahama California Oil Co., an affiliate, as geologist in Miami, Fla. Both companies are subsidiaries of Standard Oil Co. of California.

**Kenneth W. Paul,** formerly consulting geological engineer with H. Zinder & Associates, Houston, has joined Mayflo Oil Co. as manager of the lease and oil properties evaluation department. Paul was with Shell Oil Co. before joining Zinder last year.

**Robert L. Parker,** president of Parker Drilling Co., Tulsa, has organized a new company, Parker Drilling Co. of Brazil (see International). **Grover Colwell,** vice president of the Tulsa firm, is also vice president of the new company, and **R. N. Bynum,** secretary and treasurer, is vice president and secretary of the Brazilian firm. **R. M. New** will move from West Texas to Belem, Brazil, as general superintendent. **C. R. Stewart,** formerly with Parker at Booneville, Ark., has been named drilling superintendent and will headquarter at Manaus, Brazil. **Bob Tillman,** formerly of Tillman Mud Co., Oklahoma City, has moved to Manaus as general mud engineer for the Brazilian operation.

**Dallas E. Hawkins,** general manager of Fargo Oils, Ltd., has been elected vice president and general manager. Hawkins has been general manager for the past 2 years.

**S. W. Fruehling,** manager of operations in Brazil for Seismograph Service Corp. (International), has been elected a vice president of the company.

**Homer C. Mueller,** Arabian American Oil Co.'s new resident representative at Riyadh, has arrived in Saudi Arabia to take up his duties. He transferred from New York.

**E. J. Baltrusaitis** has resigned as exploration manager for Forest Oil Corp. He will join Dome Exploration (Western), Ltd., May 1 in the same capacity.

**B. G. Preston,** geophysicist with Geo Prospectors, Inc., in Tulsa, will be administrator of Societe Civile Geo Prospecteurs de France, newly formed French subsidiary of Geo Prospectors. He will headquarter in Paris.

**George F. Mandy,** technical assistant to the superintendent of compressor stations for Southern Natural Gas Co., has been promoted to assistant division superintendent of compressor stations, west. He will transfer to Pickens, Miss., from Birmingham, Ala.

**J. R. Nichols,** formerly staff production engineer for Sunray Mid-Continent Oil Co. in Alice, Tex., has been promoted to superintendent of the Ellis area in Kansas. He will headquarter in Hays. Nichols replaces **George D. Boyle,** who has retired after 29 years with the company.

**Clifford E. Bell,** superintendent of the Phoenix Lake district of Illinois Pipe Line Co. of Texas at Orange, Tex., has been appointed superintendent of Ohio Oil Co.'s eastern crude-oil pipeline section at Lima, Ohio. Illinois Pipe Line is an Ohio Oil subsidiary. Bell succeeds **M. E. Parker,** who has been appointed assistant superintendent of Ohio's Casper, Wyo., pipeline division.

**F. J. Rennie,** Rennie Oil Co., Traverse City, Mich., has been elected president of the Michigan Petroleum Association. Other officers are **George Begick,** Lansing Oil Co., vice president; **R. J. Schafer,** Shafer Oil Co., secretary; and **R. E. Rengo,** Rengo Brothers, treasurer. **Joseph D. Hadley,** Detroit, will continue as executive secretary and general counsel.

L. H. BAGBY, JR.

**Logan H. Bagby, Jr.,** independent operator, has been elected president of the Petroleum Club of Houston. **A. L. Selig** has been elected first vice president with **George C. Hardin, Jr.,** second vice president. Other officers are **Michael V. Kelly,** secretary; **H. M. Seydler,** treasurer; and **H. F. Beardmore,** assistant secretary-treasurer. Kelly, Seydler, Beardmore and **R. R. Dean** are newly elected directors. They will serve 3-year terms. Bagby succeeds **J. R. Butler** as president.

**Cleve Bowles,** administrative assistant for Signal Oil & Gas of Venezuela at Maracaibo, has been transferred to Caracas as operations geologist.

**Chester A. Davis,** New Cuyama, Calif., superintendent, for Richfield Oil Corp., has been transferred to Los Angeles as head of the reservoir engineering department. He will be succeeded in New Cuyama by **W. S. Tanner,** Santa Barbara district superintendent.

**George Rial,** an assistant director in products research for Esso Research & Engineering Co., has been transferred to the parent company as assistant technical adviser in refining coordination for Standard Oil Co. (N. J.). **George Tobias,** section head in motor lubricants, wax, and diesel-fuels section, products research, will succeed Rial as assistant director. Esso has named **Lee Shore, Harlan Smith,** and **Steve Wythe** section heads in products research. Shore, formerly a group head, succeeds Tobias. Smith heads the industrial lubes section, and Wythe the additives section. Both were formerly acting section heads. Smith succeeds **John Kolfenbuch,** now head of the new exploratory lubricants section.

**Dr. William E. Humphrey** has been appointed vice president in charge of exploration and **George Ware Knight** has been named vice president in charge of European activities for Pan American International Oil Co. Humphrey is a former vice president of T.U.L.M. Corp. Knight was formerly with Gulf Eastern Co. in London. Pan American International is a subsidiary of Pan American Petroleum Corp. Pan American Libya Oil Co., subsidiary of Pan American International, recently has received concessions in Libya totaling almost 23 million acres.

**G. J. McGraw,** field foreman, has been transferred to Gillette, Wyo., from Casper, Wyo., by The California Co.

**L. H. Proctor,** production foreman, has been transferred to Morgan City, La., from Farmington, N. M., by Magnolia Petroleum Co.

**H. R. Bolton,** vice president of Crescent Petroleum Corp., has been elected a director of Siboney-Caribbean Petroleum Co.

**Norman Stein** has been appointed a group leader at the Whiting, Ind., research laboratories of Standard Oil Co. (Ind.). Stein joined Indiana Standard in 1952.

**Baxter Boyd,** formerly vice president in charge of exploration for Republic Natural Gas Co., Dallas, has joined Rowan Drilling Co., Inc., Fort Worth, as geologist.

**Q. D. Turner,** former head of Mene Grande Oil Co.'s Las Piedras terminal, has been transferred to the company's eastern division where he will be pipeline operations manager in a reorganized pipeline department headed by **Charles M. Norris.**

**O. C. Kerfoot** has been promoted to research chemist in Continental Oil Co.'s petrochemical research division, development and research department, Ponca City, Okla. **Paul A. Lobo** has been named research group leader in the petrochemical research division.

**Paul E. McGovney,** manager of Canadian operations for Honolulu Oil Corp., has been named manager of Rocky Mountain division exploration. He will continue as Canadian operations manager but will transfer from Calgary to San Francisco. **Jack Van Wyke,** division petroleum engineer in Canada since 1955, will suceed McGovney as local Canadian manager in Calgary.

**William G. Heltzel,** Tulsa, consulting pipeline engineer, last week was made an honorary member of the Pipe Liners Club of Tulsa. Heltzel for 11 years was engineer for the first Sinclair Pipe Line Co., which became Stanolind in 1930. He served as general superintendent, operating vice president, and finally executive vice president of Stanolind before resigning in 1946 to become a consultant. His paper on fluid flow, published in The Oil and Gas Journal in 1930, is still an important guide for design engineers.

**Paul S. Strain** has been named process supervisor for International Refineries, Inc., in Wrenshall, Minn. Strain was formerly with Standard Oil Co. (Ind.), in Wood River, Ill.

**O. I. Jantz,** party chief for Amerada Petroleum Corp., has been transferred to Sinton, Tex., from Athens, Tex.

**Joe T. Kelly,** group leader in the petroleum section for American Oil Co., has been promoted to petroleum section head in the research division, research and development department, Texas City.

**J. B. Oakley,** assistant division engineer in Calgary for Pan American Petroleum Corp.'s Canadian division, has been named Alberta district engineer. **H. W. Hinkle,** Alberta district engineer, has been appointed field superintendent at the Pembina area. He succeeds **W. M. Bogert,** who becomes Edmonton area field superintendent.

**C. J. Christensen,** Pan American Petroleum Corp., Casper, Wyo., was elected chairman of the Rocky Mountain district of the API Division of Production last week in Denver. He succeeds **George Goodin,** of Petroleum Information, who becomes chairman of the district advisory committee. New vice chairmen are **Freeman Egolf,** Phillips Petroleum Co., Casper; **Roy Fuller,** Williston, N. D.; **Clyde McCarty,** Flint Rig Co., Billings, Mont.; **Sam Letteer,** Gulf Oil Corp., Denver; **L. S. Lindstrom,** Ohio Oil Co., Sidney, Neb.; and **W. G. Cutler,** Pacific Northwest Pipe Line, Salt Lake City. **Claude Peavy,** Britalta Petroleums, Ltd., Calgary, was re-elected a vice chairman to represent Canada. **Bill McCullough,** McCullough Tool Co., Casper, was elected secretary-treasurer.

## Personals

J. W. SHEEHAN

**John W. Sheehan,** formerly chief technologist at Shell Oil Co.'s Wood River, Ill., refinery, has been promoted to superintendent of the company's Norco, La., refinery. He succeeds **R. S. Douglass, Jr.,** who has been named manager of the Martinez, Calif., refinery. Sheehan has been with Shell since 1947 and had been chief technologist at Wood River since 1956.

**M. Scott Kraemer** has been promoted to division engineer in Houston for Pan American Petroleum Corp. He was formerly assistant division engineer. Kraemer succeeds **R. M. Darling,** who has been named assistant Houston district superintendent.

**Melvin A. Lee,** vice president of Laco Pipeline Contractors, Inc., will head the company's new Columbus, Ohio, branch office. Laco activities in an 11-state central and eastern region will be handled in Columbus.

**Richard P. Ryan** has been named manager of Carter Oil Co.'s eastern division. He will transfer to Mattoon, Ill., from Tulsa. Ryan succeeds **R. C. Curtis,** who has been named a vice president of Jersey Production Research Co.

**Lloyd D. Traupe,** senior geologist in Ohio Oil Co.'s Houston production division, has been promoted to assistant division geologist. Traupe was Shreveport, La., district geologist before transferring to Houston in 1950.

## DEATHS

**L. N. Savage,** 80, part owner of D. G. & S. Oil Co., Owensboro, Ky., died April 14 in Evansville, Ind.

**Robert Tabor Effinger,** 46, a chemical engineer for Shell Chemical Co., died April 17 in a Houston hospital. Effinger joined Shell Refining Co. in Martinez, Calif., in 1938.

**Milton E. Daniel,** 67, Breckenridge, Tex., independent, died April 16 in Breckenridge. Daniel was chairman of the board of Texas Christian University, his alma mater.

**Sylvester Blair Abbott,** 85, pioneer developer of Kern County, California, oil fields, died April 15 in Ojai, Calif. He had been retired since 1938.

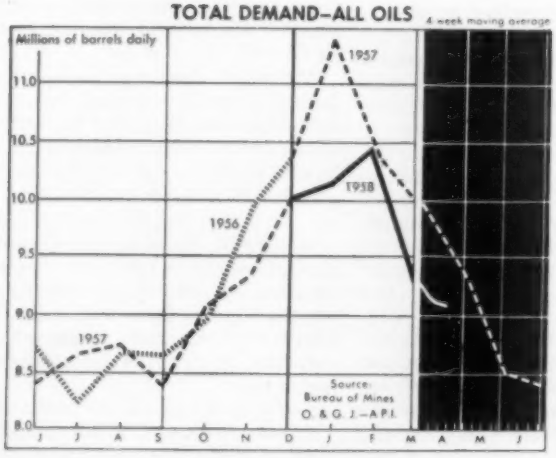
**Homer R. Pierce,** 68, retired consulting engineer, died April 21 at his home in Tulsa. Pierce was with South Penn Oil Co. before forming Oil & Gas Recovery Co. in 1935 in Pittsburgh. He later headed his own oil and gas laboratory in Tulsa.

**William Francis Brewer,** 67, retired engineer with Shell Oil Co., died April 16 in Tulsa.

# Latest Figures . . . Industry Trends

## A QUICK LOOK AT THE HIGHLIGHTS

| | LATEST WEEK | Change from WEEK AGO | | Change from YEAR AGO | |
|---|---|---|---|---|---|
| Production | 6,254,925 | UP | 63,150 | DOWN | 1,312,998 |
| Crude stocks | 279,342,000 | DOWN | 2,313,000 | UP | 24,026,000 |
| Completions | 703 | DOWN | 31 | DOWN | 300 |
| Refinery runs | 7,051,000 | DOWN | 443,000 | DOWN | 639,000 |
| Gasoline stocks | 211,030,000 | DOWN | 2,756,000 | UP | 9,085,000 |
| Kerosine stocks | 17,537,000 | UP | 131,000 | DOWN | 2,242,000 |
| Distillate stocks | 73,060,000 | DOWN | 667,000 | UP | 259,000 |
| Residual stocks | 56,794,000 | DOWN | 168,000 | UP | 19,851,000 |
| Four-product stocks | 358,421,000 | DOWN | 3,460,000 | UP | 26,953,000 |
| Total imports | 1,190,600 | DOWN | 397,400 | DOWN | 206,500 |




## Income-drilling ratio is nearer normal this year

DRILLING is not off as much as gross income from crude. Total completions through April 19 amounted to 13,874 wells. If 300 wells are added to this total to cover Pennsylvania completions that are available only on a quarterly basis, the total would be 12.3% under the 16,163 wells reported for the same period last year.

Gross income from crude has been hit from two directions. The volume of crude produced has been cut, and prices are lower in some areas. Total gross value at the well of all crude produced so far this year is estimated at $2,162,000,000. Wellhead value of all crude produced in the same period last year was $2,529,000,000. This drop of $367,000,000 represents a reduction of 14.5%.

The smaller percentage reduction in drilling can be accounted for on the basis of the abnormal drop in drilling last year. The total of 16,163 wells through the third week of April 1957 represented a reduction of 1,100 wells or 6.4% from the record set in 1956. Gross income was up about 15%.

These figures indicate that the relationship between drilling and gross income is nearer normal this year than last.

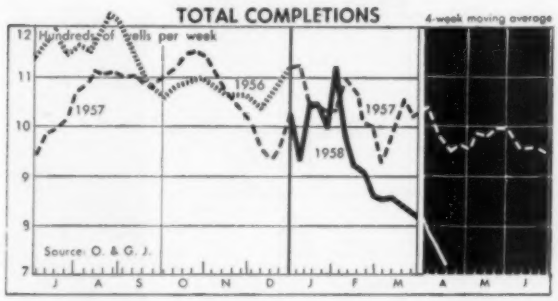
The drop in crude production accounted for about 90% of producers' income loss so far this year. If there had been no price change from last year, gross value of crude at the well would have been off by about $338,000,000. If there had been no change in volume, price cuts would have reduced income about $34,000,000. The loss due to the combination of lower prices and less production is estimated at $367,000,000.

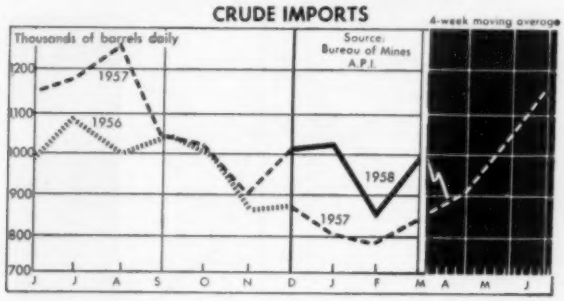
The figures on reduction due to price cuts are from a more detailed study of crude prices carried in the news section of this issue. The tabulation of price reductions, starting with the last quarter of 1957, shows that about 30% of all crude has had a cut. The average cut has been a little over 13 cents a barrel on the crude that was reduced. The over-all average crude price has been lowered about 1.29% since the end of September last year. If earlier adjustments are included, the average cut for all crude is raised to about 1.35%.

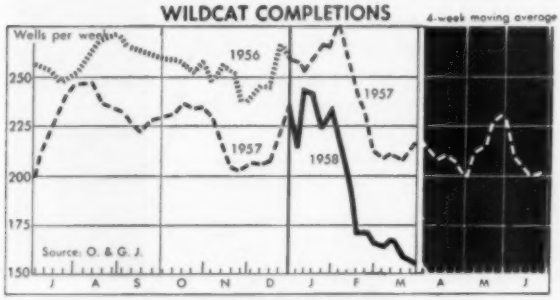
The drilling picture has been quite gloomy, but there are several pieces of evidence pointing to an upturn in the last half of the year.

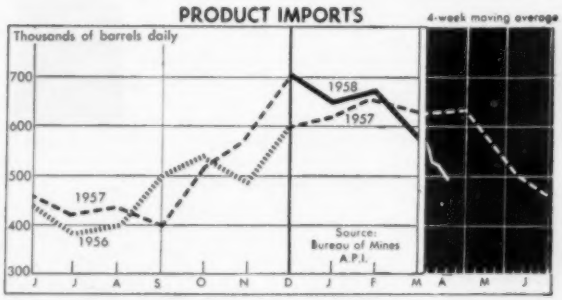
The severe cuts in production were necessary to reduce the big stock surplus. Announced production allowables call for a continuing low level of production through May. Any increase for June is likely to be small. By that time, crude and product stocks should be in line.

Increased production in the third quarter will boost producers' income with little chance that lower prices will offset the gain from greater production. The outlook is for more income from crude and for expanded drilling programs.



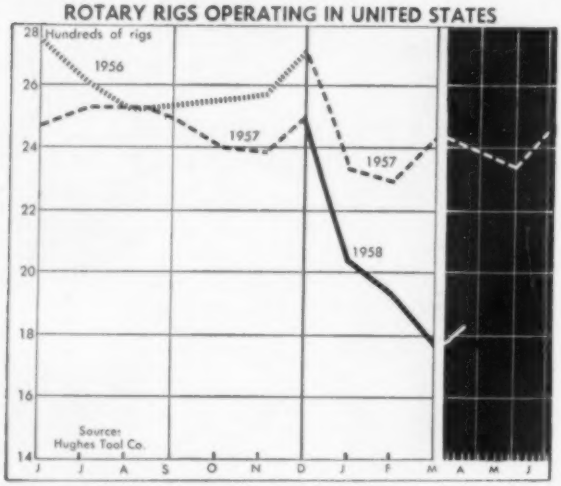



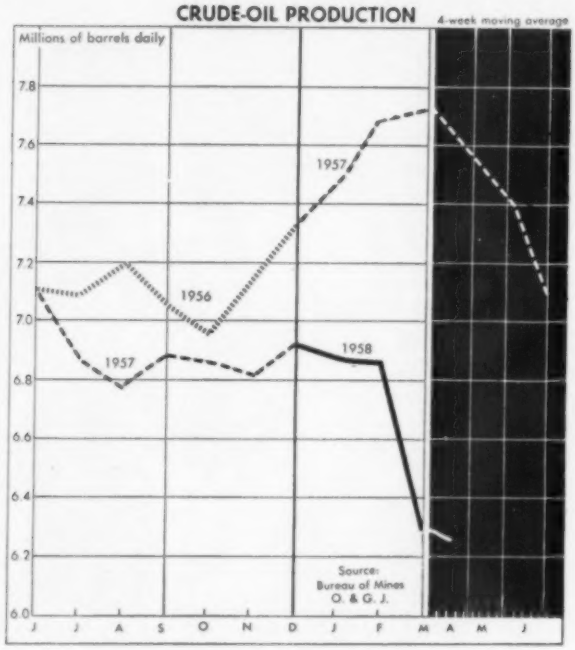

## WEEKLY WELL COMPLETIONS . . . WEEK ENDED APRIL 19, 1958

| | Total wells | | | | | | | Cumulative | | Total wildcats | | | | | Cumulative | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Crude | Cond. | Gas | Dry | Service | Footage | 1958 | 1957 | Total | Crude | Cond. | Gas | Dry | 1958 | 1957 |
| Alabama | 1 | 0 | 0 | 0 | 1 | 0 | 1,512 | 21 | 34 | 1 | 0 | 0 | 0 | 1 | 8 | 14 |
| Arkansas | 13 | 8 | 0 | 0 | 5 | 0 | 45,104 | 197 | 297 | 0 | 0 | 0 | 0 | 0 | 45 | 44 |
| California | 30 | 25 | 0 | 0 | 5 | 0 | 141,665 | 571 | 596 | 2 | 0 | 0 | 0 | 2 | 104 | 153 |
| Colorado | 13 | 2 | 0 | 1 | 10 | 0 | 78,858 | 219 | 289 | 7 | 0 | 0 | 0 | 7 | 114 | 197 |
| Illinois | 15 | 7 | 0 | 1 | 7 | 0 | 35,703 | 525 | 727 | 3 | 0 | 0 | 0 | 3 | 107 | 178 |
| Indiana | 7 | 0 | 0 | 0 | 7 | 0 | 13,649 | 188 | 188 | 7 | 0 | 0 | 0 | 7 | 72 | 41 |
| Kansas | 24 | 6 | 0 | 1 | 15 | 2 | 81,330 | 1,086 | 1,303 | 10 | 0 | 0 | 0 | 10 | 216 | 243 |
| Kentucky | 13 | 4 | 0 | 4 | 5 | 0 | 24,952 | 248 | 440 | 3 | 0 | 0 | 0 | 3 | 34 | 95 |
| Louisiana | 65 | 26 | 8 | 2 | 29 | 0 | 534,926 | 989 | 1,139 | 8 | 0 | 0 | 0 | 8 | 131 | 198 |
| North | 19 | 12 | 0 | 1 | 6 | 0 | 53,420 | 343 | 400 | 1 | 0 | 0 | 0 | 1 | 51 | 44 |
| South | 33 | 7 | 6 | 0 | 20 | 0 | 348,720 | 509 | 523 | 6 | 0 | 0 | 0 | 6 | 73 | 126 |
| Offshore | 13 | 7 | 2 | 1 | 3 | 0 | 132,786 | 137 | 216 | 1 | 0 | 0 | 0 | 1 | 7 | 28 |
| Michigan | 6 | 3 | 0 | 0 | 3 | 0 | 15,956 | 102 | 117 | 2 | 0 | 0 | 0 | 2 | 37 | 53 |
| Mississippi | 9 | 3 | 0 | 0 | 6 | 0 | 70,142 | 122 | 108 | 4 | 0 | 0 | 0 | 4 | 61 | 49 |
| Montana | 1 | 0 | 0 | 0 | 1 | 0 | 4,948 | 112 | 94 | 0 | 0 | 0 | 0 | 0 | 51 | 32 |
| Nebraska | 4 | 0 | 0 | 0 | 4 | 0 | 24,547 | 197 | 241 | 2 | 0 | 0 | 0 | 2 | 92 | 130 |
| New Mexico | 36 | 20 | 0 | 10 | 6 | 0 | 189,023 | 609 | 604 | 4 | 1 | 0 | 0 | 3 | 88 | 96 |
| West | 17 | 6 | 0 | 10 | 1 | 0 | 71,393 | 288 | 224 | 1 | 0 | 0 | 0 | 1 | 38 | 39 |
| East | 19 | 14 | 0 | 0 | 5 | 0 | 117,630 | 321 | 380 | 3 | 1 | 0 | 0 | 2 | 50 | 57 |
| New York | 10 | 5 | 0 | 0 | 0 | 5 | 13,500 | 165 | 140 | 0 | 0 | 0 | 0 | 0 | 13 | 0 |
| North Dakota | 7 | 5 | 0 | 0 | 2 | 0 | 47,474 | 122 | 90 | 2 | 1 | 0 | 0 | 1 | 41 | 34 |
| Ohio | 20 | 11 | 0 | 5 | 4 | 0 | 48,237 | 281 | 317 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| Oklahoma | 95 | 56 | 5 | 6 | 23 | 5 | 311,295 | 2,016 | 2,049 | 9 | 2 | 2 | 1 | 4 | 259 | 234 |
| Pennsylvania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 321 | 0 | 0 | 0 | 0 | 0 | 6 | 29 |
| Texas | 314 | 174 | 19 | 13 | 101 | 7 | 1,334,188 | 5,458 | 6,564 | 57 | 8 | 3 | 1 | 45 | 1,131 | 1,745 |
| Dist. 1 | 1 | 1 | 0 | 0 | 0 | 0 | 5,510 | 266 | 366 | 1 | 1 | 0 | 0 | 0 | 104 | 134 |
| Dist. 2 | 21 | 4 | 6 | 0 | 11 | 0 | 140,239 | 204 | 220 | 4 | 0 | 1 | 0 | 3 | 52 | 87 |
| Dist. 3 | 24 | 10 | 3 | 1 | 10 | 0 | 169,162 | 376 | 554 | 5 | 0 | 1 | 0 | 4 | 69 | 182 |
| Dist. 4 | 18 | 8 | 1 | 2 | 7 | 0 | 64,349 | 359 | 431 | 3 | 0 | 0 | 0 | 3 | 105 | 160 |
| East | 30 | 15 | 4 | 0 | 11 | 0 | 124,137 | 387 | 377 | 9 | 0 | 1 | 0 | 8 | 109 | 120 |
| Dist. 7-B | 48 | 20 | 1 | 2 | 23 | 2 | 130,837 | 716 | 869 | 14 | 4 | 0 | 1 | 9 | 209 | 314 |
| West | 91 | 79 | 1 | 0 | 11 | 0 | 430,633 | 1,636 | 1,855 | 6 | 0 | 0 | 0 | 6 | 238 | 296 |
| Dist. 9 | 55 | 26 | 0 | 2 | 22 | 5 | 160,576 | 1,118 | 1,486 | 13 | 3 | 0 | 0 | 10 | 213 | 420 |
| Dist. 10 | 26 | 11 | 3 | 6 | 6 | 0 | 108,745 | 396 | 406 | 2 | 0 | 0 | 0 | 2 | 32 | 32 |
| Utah | 6 | 3 | 0 | 0 | 3 | 0 | 32,010 | 135 | 49 | 3 | 0 | 0 | 0 | 3 | 25 | 31 |
| West Virginia | 8 | 2 | 0 | 5 | 0 | 1 | 13,200 | 209 | 196 | 0 | 0 | 0 | 0 | 0 | 7 | 9 |
| Wyoming | 5 | 3 | 0 | 0 | 2 | 0 | 17,909 | 236 | 236 | 2 | 0 | 0 | 0 | 2 | 75 | 86 |
| Misc. (S. D.) | 1 | 0 | 0 | 0 | 1 | 0 | 2,540 | 34 | 24 | 1 | 0 | 0 | 0 | 1 | 28 | 19 |
| Total U. S. | 703 | 363 | 32 | 48 | 240 | 20 | 3,082,668 | 13,874 | 16,163 | 127 | 12 | 5 | 2 | 108 | 2,748 | 3,713 |
| Total prev. week | 734 | 356 | 19 | 48 | 295 | 16 | 3,413,078 | ..... | ..... | 136 | 21 | 4 | 4 | 107 | ..... | ..... |
| Cum. 1958 | 13,874 | 6,931 | 339 | 1,033 | 5,270 | 301 | 59,171,524 | ..... | ..... | 2,748 | 258 | 44 | 97 | 2,349 | ..... | ..... |
| Western Canada | 77 | 41 | 0 | 5 | 31 | 0 | 434,942 | 750 | 805 | 31 | 4 | 0 | 3 | 24 | 286 | 224 |

## ROTARY RIGS OPERATING IN UNITED STATES




## CRUDE-OIL PRODUCTION




## ACTIVE ROTARY RIGS*

| | 4-21-58 | 4-14-58 | 4-7-58 | 4-22-57 |
|---|---|---|---|---|
| Alabama | 4 | 5 | 4 | 8 |
| Arkansas | 17 | 15 | 17 | 19 |
| Arizona | .... | .... | .... | 1 |
| California | 66 | 65 | 70 | 85 |
| Colorado | 25 | 25 | 27 | 34 |
| Florida | 1 | 1 | 1 | 3 |
| Georgia | .... | .... | .... | .... |
| Idaho | .... | .... | .... | .... |
| Illinois | 42 | 35 | 27 | 44 |
| Indiana | 6 | 6 | 7 | 7 |
| Iowa | 3 | 3 | 3 | 2 |
| Kansas | 129 | 109 | 93 | 164 |
| Kentucky | 3 | 3 | 2 | 4 |
| Louisiana | 307 | 300 | 304 | 418 |
| North | 35 | 38 | 29 | 53 |
| South | 222 | 211 | 223 | 269 |
| Offshore | 50 | 51 | 52 | 96 |
| Maryland | .... | .... | .... | 1 |
| Michigan | 10 | 8 | 8 | 13 |
| Missouri | .... | .... | .... | 1 |
| Montana | 24 | 23 | 21 | 27 |
| Mississippi | 36 | 37 | 33 | 30 |
| Nebraska | 17 | 13 | 18 | 30 |
| Nevada | .... | .... | .... | .... |
| New Mexico | 115 | 110 | 105 | 141 |
| New York | .... | 1 | 1 | 1 |
| North Dakota | 33 | 37 | 35 | 23 |
| Ohio | .... | .... | .... | .... |
| Oklahoma | 194 | 195 | 191 | 247 |
| Oregon | .... | .... | .... | 1 |
| Pennsylvania | 12 | 11 | 10 | 10 |
| South Dakota | .... | .... | .... | 2 |
| Texas | 705 | 727 | 730 | 1,031 |
| Gulf Coast | 173 | 177 | 157 | 225 |
| Offshore | 3 | 5 | 4 | 5 |
| West | 285 | 289 | 292 | 396 |
| North | 205 | 227 | 236 | 349 |
| East | 39 | 29 | 41 | 56 |
| Tennessee | .... | .... | .... | .... |
| Utah | 31 | 32 | 36 | 31 |
| Washington | 1 | 2 | 2 | .... |
| West Virginia | 4 | 4 | 4 | 1 |
| Wyoming | 46 | 43 | 40 | 53 |
| Virginia | .... | .... | .... | .... |
| Total United States | 1,831 | 1,810 | 1,789 | 2,432 |
| Western Canada | 75 | 84 | 115 | 99 |
| Eastern Canada | 1 | 1 | 2 | .... |
| Grand total | 1,907 | 1,895 | 1,906 | 2,531 |

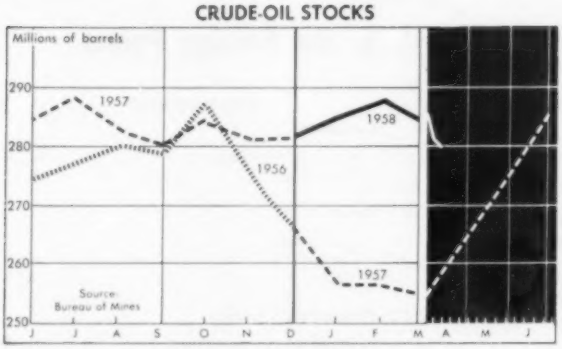
*Hughes Tool Co.

## DAILY AVERAGE PRODUCTION FOR WEEK

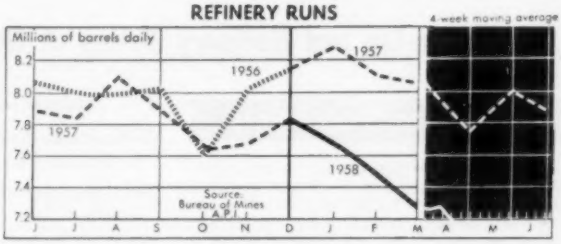
| | April 19, 1958 | | | April 12 |
|---|---|---|---|---|
| | Crude oil | Lease condensate | Total | total |
| Alabama | 16,100 | ..... | 16,100 | 15,950 |
| Arkansas | 81,500 | 200 | 81,700 | 81,500 |
| California | 874,100 | ..... | 874,100 | 875,200 |
| Colorado | 139,350 | ..... | 139,350 | 137,000 |
| Eastern | 48,800 | ..... | 48,800 | 49,000 |
| Florida | 1,275 | ..... | 1,275 | 1,275 |
| Illinois | 219,000 | ..... | 219,000 | 226,500 |
| Indiana | 30,100 | ..... | 30,100 | 32,900 |
| Kansas | †327,525 | ..... | †327,525 | †299,700 |
| Kentucky | 43,900 | ..... | 43,900 | 44,600 |
| Louisiana | 738,350 | 87,775 | 826,125 | 825,775 |
| North | 113,350 | 2,900 | 116,250 | 115,900 |
| South | 625,000 | 84,875 | 709,875 | 709,875 |
| Michigan | 23,800 | ..... | 23,800 | 23,800 |
| Mississippi | 98,350 | 5,000 | 103,350 | 103,350 |
| Montana | 73,600 | ..... | 73,600 | 73,500 |
| Nebraska | 52,125 | ..... | 52,125 | 51,900 |
| Nevada | 100 | ..... | 100 | 100 |
| New Mexico | 252,075 | 6,800 | 258,875 | 258,325 |
| North Dakota | 36,000 | ..... | 36,000 | 24,350 |
| Oklahoma | †560,300 | ..... | †560,300 | †524,000 |
| Texas | 2,157,500 | 63,900 | 2,221,400 | 2,221,400 |
| Dist. 1 | 45,000 | 400 | 45,400 | 45,400 |
| Dist. 2 | 89,000 | 9,100 | 98,100 | 98,100 |
| Dist. 3 | 316,000 | 32,000 | 348,000 | 348,000 |
| Dist. 4 | 157,500 | 7,600 | 165,100 | 165,100 |
| Dist. 5 | 27,000 | 400 | 27,400 | 27,400 |
| Dist. 6 | 96,000 | 7,400 | 103,400 | 103,400 |
| East Texas Field | 117,000 | ..... | 117,000 | 117,000 |
| Dist. 7-B | 129,000 | 100 | 129,100 | 129,100 |
| Dist. 7-C | 110,000 | 3,550 | 113,550 | 113,550 |
| Dist. 8 | 775,000 | 1,500 | 776,500 | 776,500 |
| Dist. 9 | 189,000 | 1,200 | 190,200 | 190,200 |
| Dist. 10 | 107,000 | 650 | 107,650 | 107,650 |
| Utah | 12,700 | ..... | 12,700 | 11,100 |
| Wyoming | 304,550 | ..... | 304,550 | 310,400 |
| Others | ‡150 | ..... | ‡150 | ‡150 |
| Total U. S. | 6,091,250 | 163,675 | **6,254,925** | 6,191,775 |
| Change from previous week, up | | | **63,150** | |
| Canada | †442,800 | ..... | †442,800 | †365,600 |
| Total U. S. production—January 1-April 19 | | | | 718,879,525 bbl. |
| Same period last year (crude plus cond.) | | | | *829,589,529 bbl. |

*Includes 15,736,900 bbl. condensate. †Week ended previous Monday. ‡South Dakota.

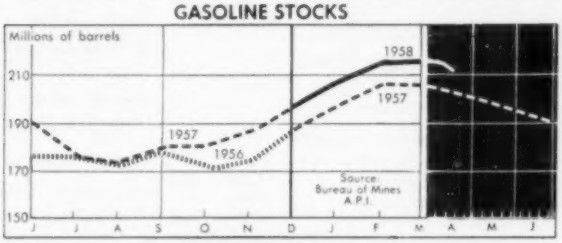
## CRUDE-OIL STOCKS



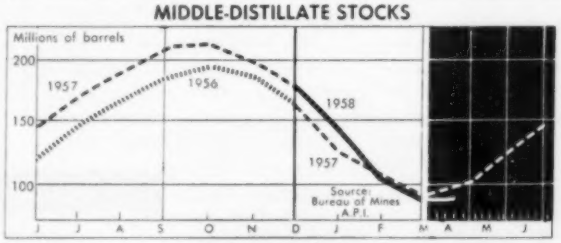

## REFINERY RUNS



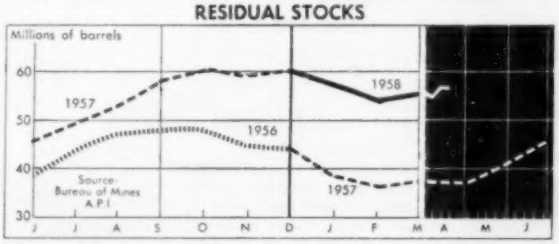

## GASOLINE STOCKS




## MIDDLE-DISTILLATE STOCKS




## RESIDUAL STOCKS




## CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

| | 4-12-58 | 4-5-58 | 4-13-57 |
|---|---|---|---|
| Pennsylvania Grade | 2,884 | 2,850 | 2,642 |
| Other Appalachian | 1,351 | 1,544 | 1,890 |
| Illinois, Indiana, and Michigan | 9,871 | 9,802 | 9,134 |
| Nebraska and North Dakota | 2,578 | 2,508 | 2,106 |
| Kansas | 10,051 | 9,576 | 8,602 |
| Oklahoma | 17,450 | 17,957 | 22,405 |
| Arkansas | 2,598 | 2,664 | 2,561 |
| Louisiana | 17,679 | 17,939 | 18,527 |
| North | 2,714 | 3,092 | 2,826 |
| South | 14,965 | 14,847 | 15,701 |
| Mississippi, Alabama, and Florida | 2,448 | 2,710 | 2,257 |
| New Mexico | 8,008 | 8,184 | 7,277 |
| Texas | 126,034 | 127,232 | 116,130 |
| East Texas | 8,323 | 8,351 | 10,969 |
| West Texas | 57,653 | 56,695 | 53,580 |
| Texas Gulf | 25,581 | 26,436 | 22,047 |
| Other Texas | 34,477 | 35,750 | 29,534 |
| Wyoming | 15,520 | 16,155 | 16,223 |
| Other Rocky Mountain | 7,094 | 7,016 | 6,069 |
| California | 38,394 | 38,937 | 25,995 |
| Foreign | †17,382 | †16,581 | 13,498 |
| Total | 279,342 | 281,655 | 255,316 |

*Bureau of Mines. †Includes 4,616,000 bbl. in California.

## A.P.I. REFINERY REPORT, APRIL 18, 1958

(Thousands of barrels)

| District— | Daily avg. runs | Daily average production—Gaso.* | Kero. | Dist. | Resid. | Stocks‡—Gaso.† | Kero. | Dist. | Resid. | Bureau of Mines, April 1957—Daily avg. runs | Daily average production—Gaso.* | Kero. | Dist. | Resid. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East Coast | 1,093 | 451.7 | 39.0 | 288.9 | 149.6 | 46,947 | 7,046 | 20,856 | 10,436 | 1,187 | 483.8 | 34.0 | 315.7 | 212.5 |
| Appalachian: | | | | | | | | | | | | | | |
| District 1 | 81 | 34.7 | 4.4 | 20.0 | 5.6 | 4,991 | 557 | 1,738 | 642 | 96 | 39.7 | 5.5 | 19.2 | 7.2 |
| District 2 | 78 | 39.6 | 2.9 | 15.6 | 7.0 | 2,613 | 318 | 730 | 488 | 106 | 51.7 | 5.0 | 15.2 | 13.5 |
| Ind., Ill., Ky. | 1,198 | 617.4 | 63.8 | 233.3 | 143.4 | 40,668 | 3,458 | 10,351 | 4,290 | 1,284 | 667.5 | 62.8 | 268.2 | 158.4 |
| Minn., Wis., Dak. | 107 | 51.0 | 5.9 | 28.9 | 11.0 | 6,630 | 449 | 3,326 | 580 | 87 | 41.2 | 5.2 | 23.2 | 7.7 |
| Okla., Kans., Mo. | 612 | 334.0 | 13.6 | 121.8 | 20.7 | 19,028 | 901 | 6,117 | 891 | 629 | 353.6 | 17.8 | 140.2 | 29.6 |
| Inland Texas | 260 | 194.8 | 10.9 | 48.0 | 20.0 | 7,894 | 346 | 1,252 | 2,029 | 251 | 190.6 | 7.5 | 50.9 | 20.5 |
| Texas Gulf Coast | 1,683 | 847.3 | 67.8 | 453.1 | 182.6 | 27,804 | 1,687 | 8,196 | 4,424 | 1,954 | 871.6 | 78.8 | 493.9 | 223.9 |
| La. Gulf Coast | 590 | 336.4 | 50.6 | 129.7 | 36.4 | 11,698 | 1,602 | 3,775 | 1,105 | 664 | 332.7 | 56.5 | 177.0 | 53.5 |
| N. La. and Ark. | 92 | 34.6 | 7.0 | 21.6 | 9.7 | 5,526 | 628 | 1,731 | 105 | 66 | 25.0 | 3.0 | 16.5 | 5.3 |
| Rocky Mountain: | | | | | | | | | | | | | | |
| New Mexico | 24 | 11.9 | 1.0 | 5.0 | 2.7 | 432 | 16 | 120 | 90 | 28 | 15.3 | 0.4 | 5.4 | 2.4 |
| Other Rocky Mt. | 226 | 97.7 | 0.1 | 50.3 | 30.7 | 7,807 | 198 | 2,571 | 896 | 239 | 112.6 | 1.4 | 56.4 | 33.8 |
| West Coast | 1,007 | 451.3 | 7.0 | 141.1 | 308.4 | 28,992 | 331 | 12,297 | 30,818 | 1,149 | 501.8 | 5.3 | 182.7 | 363.8 |
| April 18, 1958 | 7,051 | 3,504.4 | 274.0 | 1,557.3 | 927.8 | 211,030 | 17,537 | 73,060 | 56,794 | 7,740 | 3,687.1 | 284.0 | 1,764.5 | 1,132.1 |
| April 11, 1958 | §7,494 | 3,688.1 | 290.1 | 1,674.3 | 1,035.4 | 213,786 | 17,406 | 73,727 | 56,962 | ..... | ..... | ..... | ..... | ..... |
| April 19, 1957 | 7,690 | 3,767.1 | 308.0 | 1,706.0 | 1,192.1 | 201,945 | 19,779 | 72,801 | 36,943 | ..... | ..... | ..... | ..... | ..... |

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines. §Revised.

# Crude-Oil and Refinery Prices at Representative U. S. and Foreign Points

## REFINED-PRODUCT PRICES

Following quotations are for refinery products in cents per gallon moving in interstate shipments on Wednesday each week unless otherwise noted. Crude-oil prices are per barrel at the wells unless otherwise listed.

### GASOLINE*

| | |
|---|---|
| **Mid-Continent (Group 3):** | |
| Regular (89 octane) | 11.00-11.50 |
| Premium (98 octane) | 13.75-14.25 |
| **Gulf Coast (cargoes for coastwise or export movements):** | |
| Regular (90 octane) | 9.75-10.25 |
| Regular (92 octane) | 10.00-10.50 |
| Premium (97 octane) | 11.375-11.75 |
| Premium (98 octane) | 11.875-12.50 |
| **California (rack) (Los Angeles):** | |
| Regular (88 octane) | 12.0 |
| Premium (96 octane) | 14.5 |
| Premium (98 octane) | 15.0 |
| **Caribbean area (cargoes):** | |
| Regular (87 octane) | 9.625 |
| Premium (98 octane) | 12.125 |

*Quotations are for octanes shown. Prices usually vary with octane ratings within the regular, premium, and aviation grades.

### NATURAL GASOLINE*

| | |
|---|---|
| **Group 3:** | |
| Grade 26-70 | 4.5 |
| **Breckenridge:** | |
| Grade 26-70 | 4.0 |

*If 26-70 natural is considered as 100 per cent, prices for lower-vapor-pressure grades increase 2.5 per cent for each unit drop in Reid vapor pressure down to and including 16 lb. Prices for grades below 16 lb. may vary slightly by areas or plants.

### KEROSINE AND DISTILLATE

| | |
|---|---|
| **Mid-Continent (Group 3):** | |
| Kerosine 42-44 | 9.25-9.50 |
| Diesel oil (58 d.i. and above) | 8.875-9.125 |
| Distillate No. 1 | 8.875-9.125 |
| Distillate No. 2 | 8.25-8.50 |
| **Gulf Coast (cargoes):** | |
| Kerosine 41-43 | 8.50-8.75 |
| Distillate No. 2 | 8.00-8.25 |
| **New York Harbor (barges):** | |
| Kerosine 41-43 | 9.35 |
| Distillate No. 2 | 8.85 |
| Diesel fuel, 48-52 d.i. | 9.45 |
| **Caribbean area (cargoes):** | |
| Distillate No. 2 | 8.125 |

### WAX (LB.)

| | |
|---|---|
| **Oklahoma (Group 3):** | |
| 132-135 A.m.p. (semi-refined) in tank cars | 6.50 |
| **New York (export):** | |
| 126-130 A.m.p. crude-scale (solid in bags or barrels) | 7.35 |

★Denotes change from previous week.

### RESIDUAL FUEL (BBL.)

| | |
|---|---|
| **Mid-Continent (Group 3):** | |
| Residual fuel (max 1% S) | $1.25-1.30 |
| **Gulf Coast (cargoes):** | |
| Bunker C fuel | $2.25-2.40 |
| **New York Harbor (barges):** | |
| Bunker C fuel | $2.65 |
| **Caribbean (cargoes):** | |
| Bunker C | $2.25 |
| **California (rack):** | |
| Bunker C fuel, Los Angeles | $2.45 |

### LUBRICATING OILS

| | |
|---|---|
| **Mid-Continent (Group 3):** | |
| 150-160 bright stock, solvent refined, 0-10 p.p., 95 v.i. | 23.0 |
| 200 vis. neutral oil, solvent refined, 0-10 p.p., 95 v.i. | 20.5 |
| **Pennsylvania Grade:** | |
| 145-155 vis. at 210, bright stock, 8 color, 25 p.t. | 26 |
| 200 vis. neutral (180° at 100°), 25 p.t. | 24 |

## CRUDE-OIL PRICES

### GRAVITY SCHEDULE

| | ★Signal Hill, Calif. | Mid-Cont.* | Gulf Coast Tex.† | West Tex.‡ N.M. | Wyo. (sour) |
|---|---|---|---|---|---|
| 14-14.9 | $2.47 | .... | .... | .... | .... |
| 15-15.9 | 2.52 | .... | .... | .... | $1.81 |
| 16-16.9 | 2.58 | .... | .... | .... | 1.86 |
| 17-17.9 | 2.63 | .... | .... | .... | 1.91 |
| 18-18.9 | 2.69 | .... | .... | .... | 1.96 |
| 19-19.9 | 2.74 | .... | .... | .... | 2.01 |
| 20-20.9 | 2.80 | $2.75 | .... | $2.62 | 2.06 |
| 21-21.9 | 2.85 | 2.77 | .... | 2.64 | 2.11 |
| 22-22.9 | 2.91 | 2.79 | .... | 2.66 | 2.16 |
| 23-23.9 | 2.96 | 2.81 | $3.44 | 2.68 | 2.21 |
| 24-24.9 | 3.02 | 2.83 | 3.46 | 2.70 | 2.26 |
| 25-25.9 | 3.07 | 2.85 | 3.48 | 2.72 | 2.31 |
| 26-26.9 | 3.13 | 2.87 | 3.50 | 2.74 | 2.36 |
| 27-27.9 | 3.17 | 2.89 | 3.52 | 2.76 | 2.49 |
| 28-28.9 | 3.22 | 2.91 | 3.54 | 2.78 | 2.54 |
| 29-29.9 | 3.27 | 2.93 | 3.56 | 2.80 | 2.59 |
| 30-30.9 | 3.32 | 2.95 | .... | 2.82 | 2.63 |
| 31-31.9 | 3.38 | 2.97 | .... | 2.84 | 2.67 |
| 32-32.9 | 3.44 | 2.99 | .... | 2.86 | 2.71 |
| 33-33.9 | 3.50 | 3.01 | .... | 2.88 | 2.75 |
| 34-34.9 | 3.56 | 3.03 | .... | 2.90 | 2.79 |
| 35-35.9 | 3.61 | 3.05 | .... | 2.92 | 2.83 |
| 36-36.9 | 3.65 | 3.07 | .... | 2.94 | 2.87 |
| 37-37.9 | 3.68 | 3.09 | .... | 2.96 | 2.89 |
| 38-38.9 | .... | 3.11 | .... | 2.98 | 2.91 |
| 39-39.9 | .... | 3.13 | .... | 3.00 | 2.93 |
| 40 and up | .... | 3.15 | .... | 3.02 | 2.95 |

*Includes Oklahoma (sweet), part of Kansas, North Dakota, W. Texas (sweet). Some Oklahoma available for 15 cents less starting 3-17-58 and other at 10 cents less on 4-1-58. †Low cold test crude. ‡Sour.

Effective dates of broad changes: California, 4-14-58; east of California, January 3-10, 1957; Pennsylvania Grade 4-16-58.

### FLAT PRICES

| | |
|---|---|
| **Louisiana:** | |
| Bienville (distillate) | $3.05 |
| Ville Platte | 3.45 |
| **Texas:** | |
| East Texas | 3.25 |
| Conroe | 3.53 |
| Van | 3.08 |
| **Pennsylvania Grade:** | |
| Bradford | 4.15 |
| Middle District | 3.97 |
| Southwest Pennsylvania | 3.68 |
| West Virginia | 3.50 |
| Buckeye Grade | 3.50 |
| **Illinois Basin** | 3.00 |
| **Canada:** | |
| Leduc-Woodbend | 2.67 |
| Redwater (Alta.) | 2.56 |
| Smiley (Sask.) | 2.33 |
| Pembina | 2.54 |

### FOREIGN

| | |
|---|---|
| **Venezuela:** | |
| Cumarebo, 48°-49.9°, Tucupido | 3.75 |
| San Joaquin, 41°-41.9°, Puerto La Cruz | 3.34 |
| Oficina, 35°-35.9°, Puerto La Cruz | 3.05 |
| Tia Juana medium, 26.5°-26.9°, Amuay* | 2.55 |
| Quiriquire, 16.0°-16.4°, Caripito | 2.30 |
| Lagunillas heavy, flat, Amuay or Las Piedras* | 2.25 |
| Bachaquero, flat, 15°-16°, Las Piedras* | 2.05 |

Prices for all crudes of 24° or lighter vary 2 cents per degree change, up or down. All crudes heavier than 24° vary 2.5 cents per half-degree gravity change.

*Also available at La Salina at 3 cents per barrel less.

| | |
|---|---|
| **Middle East, Persian Gulf (cargoes, f.o.b. lifting port):** | |
| Arabian, 36.0°-36.9°, Ras Tanura | $2.12 |
| Iranian, 34.0°-34.9°, Bandar Masur | 2.04 |
| Iranian, 34.0°-34.9°, Abadan | 1.99 |
| Iraq, 35.0°-35.9°, Fao | 1.98 |
| Kuwait, 31.0°-31.9°, Mina-al-Ahmadi | 1.85 |
| Qatar, 41.0°-41.9°, Umm Said | 2.23 |
| **Middle East, E. Mediterranean:** | |
| Arabian, 36.0°-36.9°, Sidon | 2.49 |
| Iraq, 36.0°-36.9°, Tripoli, Banias | 2.49 |
| **Far East (cargoes, f.o.b. Lutong, Sarawak):** | |
| Seria Light, 37° | 2.75 |

### TANKER RATES PER LONG TON

(Latest reported spot fixtures)

| | |
|---|---|
| Carib.-U.S.N.H., clean (Scale—45%) (9s. 4d.) | $1.31 |
| ★ Carib.-U.S.N.H., dirty (USMC—60%) | 1.08 |
| ★ Sidon-U.S.N.H., dirty (USMC—70%) | 2.34 |
| Gulf-U.S.N.H., clean (USMC—37.5%) | 1.78 |

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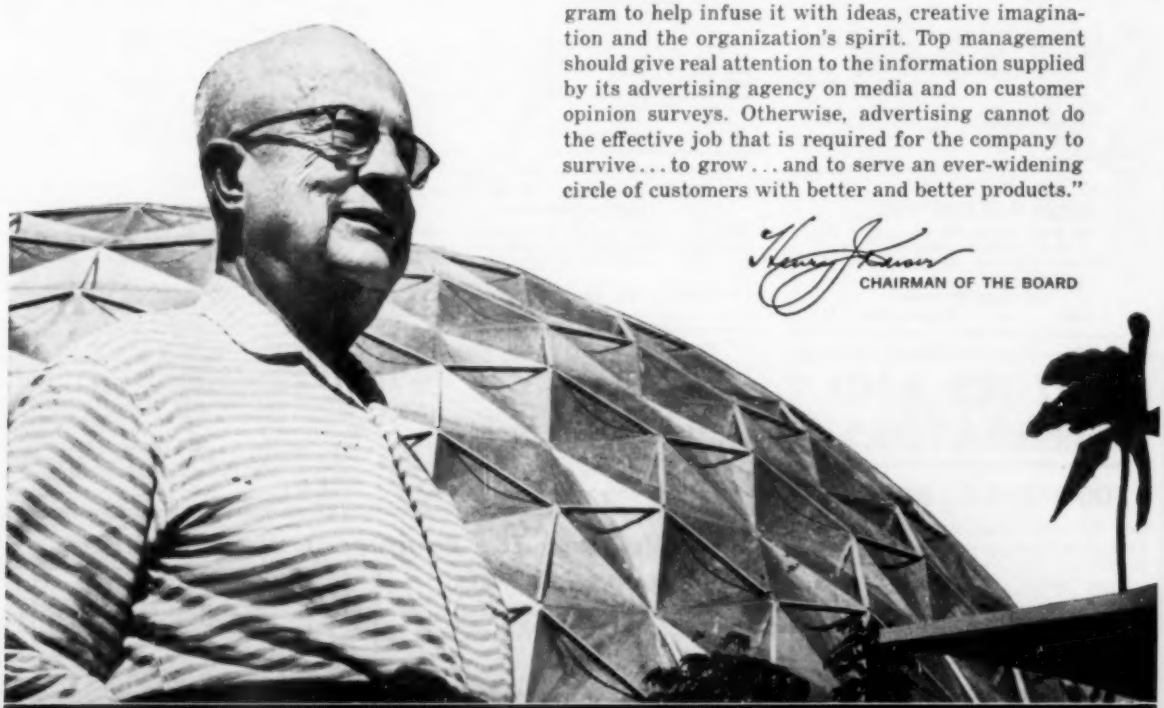
*Says Henry J. Kaiser:*

***"I confess I was not always advertising-conscious..."***

*"American management cannot afford to relegate advertising to a secondary role.* Management cannot afford to budget funds begrudgingly to advertising and then proceed to forget it, except perhaps to make an occasional carping criticism. Instead, advertising men must be taken closely into inner management counsels—for able advertising men can make a fantastically tremendous contribution to a company. I confess that I was not always advertising-conscious. In many years as a builder, I wouldn't permit the Kaiser name to be painted even on a steamshovel. If I have today reversed this attitude completely, it is because advertising has proved its worth—many times over—in practical business applications. Now, our whole organization is advertising-minded. Top management should take constant interest in the advertising program to help infuse it with ideas, creative imagination and the organization's spirit. Top management should give real attention to the information supplied by its advertising agency on media and on customer opinion surveys. Otherwise, advertising cannot do the effective job that is required for the company to survive... to grow... and to serve an ever-widening circle of customers with better and better products."

Henry J. Kaiser

CHAIRMAN OF THE BOARD



Thanks to the advertising pages of the trade press, American industry today has a wide choice of advanced techniques and improved tools and materials. This speeds production, steps up quality, cuts production costs. Then advertising, in return, lowers selling costs to the consumer. Result:

AMERICA IS A BETTER AMERICA—THANKS TO ADVERTISING!

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**DISPLAY CLASSIFIED**
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Address Classified Advertising Material: The Oil and Gas Journal, P. O. Box 1260, Tulsa 1, Okla.

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20,000 FT. OF 1¼" EUE Seamless Well Tubing, T&C, 21 ft. R/L. Excellent condition. Price—30c foot F.O.B. our yard. M. KAPLAN & SON, INC., Monroe, Louisiana. Phone FAirfax 2-5112.

SALES AND RENTALS. Used cable drilling and fishing tools, casing, production equipment; from the Southwest's largest stock of oil field supplies. Degen Pipe and Supply Co., Tulsa.

FOR SALE at Wichita, Kansas, one 7' x 37'8" used Tulsa type welded vertical absorber with double mist extractor, shell 5/16" head 3/8", test 120#, with 6 Koch Kaskade sections installed on 24" spacing, welded inside and outside. Last used as lean oil dehydrator. $1500.00. Cities Service Oil—Patridge—Bartlesville.

FOR SALE at Wichita, Kansas, 1—5' x 24'11" used Tulsa type vertical dephlegmator, code welded, 3/8" shell FQ, 1/2" heads FQ-ASME, 6 trays 20" spacing 1/2" thick, large 16 ga. bubble caps, 17% chrome stainless steel 1" slot design, risers 2" OD 13 ga. boiler tubes, serial No. 1817, WP 75#, temp. 450° F., corrosion allowance .166. New 1944. $1500.00. Cities Service Oil — Patridge — Bartlesville.

**25,000 FEET 16" O.C.**
**USED GAS LINE PIPE**
**¼" wall, 42 pounds per foot**
**16-20' random lengths**
**Machine Cleaned—Beveled Ends**
**BROWN-STRAUSS CORP.**
**1546 Guinotte Ave.**
**HA. 1-1000 Kansas City, Mo.**

## MOTORS AND GENERATORS

### 1500 HP D.C. MOTORS

1500 HP—525 volts D.C.—600 R.P.M.—NEW—2-bearing continuous duty motors—manufactured by Westinghouse. In original crates. From Navy Destroyer Escort. SPECIFICATIONS: 2-bearing 1500 HP—325 volts DC—2270 amps—600 RPM—ambient temperature 40° C—class B insulation—2-bearing pedestal sleeve type—shunt wound—efficiency 94.23%. ONLY 6 AVAILABLE—BUY NOW AND SAVE. Suitable for steel mill drive—offshore oil rigs—rolling mill drive—dredge pump applications.

### 1200 KW GENERATORS

(2) Equal to new—manufactured by Allis-Chalmers. 1200 KW—525 volts D.C. —2290 amps—750 RPM—cooling self-ventilated—totally enclosed—separate excitation—continuous duty—class B insulation —Mfg. type M.H.C.—frog leg armature.

**The Boston Metals Co.**
313 E. Baltimore St. ELGIN 5-5050 — Baltimore 2, Md. LEXINGTON 9-1900

## FOR SALE EQUIPMENT

1 36L BUCYRUS Spudder complete with 5 and 7 inch tailing in tools. Dog house, butane tank, junk rack and light plant. Rod and tubing tools and hand tools. Phone Office 144, Res. 614, Cleveland, Oklahoma.

WELL DRILLS - CORE DRILLS. Everything for well and core drilling in both new and used equipment, at money saving prices. Fishing tools rented. Send for bulletins. Pressey & Son, Pueblo, Colo.

FOR SALE at Wichita, Kansas, 1—6' x 27'7" Tulsa type evaporator, code welded, ¼" ASTM-A-70 FQ & FBQ shell, 3/8" ditto heads, 8 trays ½" thick, downcomers and seals ¼", large size bubble caps #16 ga., 17% chrome stainless 1" slots, one heating element with 90 3/4" OD 14 ga. seamless steel U tubes. Shell test 113#, tube test 300#. $1000.00. Cities Service Oil — Patridge — Bartlesville.

WELL SERVICING Equipment—Wichtex C-60 and C-65 heavy duty double drum units mounted on tandem trucks, three Ford pickup trucks plus complete tools, lines and equipment. Priced to sell. Located Abilene, Texas. Phone OR 2-5734, Abilene, or ED 6-3788, Fort Worth.

**2—Cooper-Bessemer GMR-3 and**
**1—Worthington LCE-6, 225 HP Angle Type Compressors.**

Each equipped with 3 compressor cylinders. Machines disassembled and ready for shipment. Location—North Central Texas.

**Reply P. O. Box 2291, Tulsa, Oklahoma**

### COMPLETE ROTARY RIGS

two to ten thousand feet. Terms available. Will lease with option to purchase. For price and location contact

**Cardwell Investment Company, Inc.**
**G. D. DRYDEN—AM 5-2611**
**604 Petroleum Building**
**Wichita, Kansas**

## FOR SALE EQUIPMENT

1 GMC PERFORATING TRUCK, complete with Gamma Ray logging equipment 20,000' line capacity. Perfect condition. Will sell with or without logging equipment and line. Box K-487, The Oil and Gas Journal, Tulsa, Oklahoma.

THREE CARDWELL RL double-drum spudders complete with double masts, lines and tools, good condition, now working in Northern Oklahoma. Consider trade. Box 4294, Okla. City 9, Okla. Phone: ORange 7-2242 or PErshing 2-5577.

8500' RIG COMPLETE, ready to go. Located in Ward Cty., No. Dak. Will take interest with responsible parties. Box 1724—Ph. 9-3193, Billings, Montana.

32S WALKER-NEER New Lines, belts, motor. Priced to sell. Tools: 12" to 4". All accessories. Steel Dog House. Can move anywhere. R. R. McInnis, 2920 E. 26th Place, Tulsa. RI 7-7070 or RI 7-4650.

1000 MAYHEW ROTARY RIG with 500 ft. drill pipe, bits for use up to 30 inches, mounted on 3 ton Dodge truck. Will sell or trade for drilling a hole in Cowley county, Kansas. Reynolds Plumbing, Inc.—Wichita, AM 2-6437.

FOR SALE OR RENT: Packaged or stationary gas compressors, from 50 h.p. to 400 h.p. Alfred B. Kern, 305 Kennedy Bldg., Tulsa, Oklahoma.

MUST SELL—24L, 28L, 36L Bucyrus complete with tools from 12" down, 1500 Failing complete also tubing and casing. Box 1215, Tulsa 1, Oklahoma. Phone DI 3-9563.

1700 FEET 7 INCH O.D. J-55 Seamless insert Streamline casing. Range 3. Used. Strictly A1. Bulldog Pipe & Supply Co., Box 1153, Phone CH 2-1657, Tulsa.

TWO 6000-8000 FT. latest model J-450 Cardwell Rigs including complete rotary drilling equipment and 3000 feet 4½" drill pipe. Located on Mississippi River for low cost foreign shipment. Cardwell Investment Co., Inc.; 604 Petroleum Building; Wichita 2, Kansas.

## *"We Own The Equipment We Advertise"*

### TANKS & TOWERS

14' x 21' x 1" Shell, Steel
12' x 43' x 3/8" Shell, Steel
**8½' x 19' x ¼" Shell, T-316SS**
14" x 40' Tower, 160#
18" x 23' Tower, 160#
24" x 28' Tower, 550#

8' x 75', 20 Tray, 25#
5' x 96', 40 Tray, 135#
24" x 45', 24 Tray
18" x 32', 15 Tray, 160#
24" x 42', 22 Tray, 230# T-304SS
18" x 23', 11 Tray, 220# T-316SS
30" x 20', 8 Tray, 50# T-304SS

**Valves:** Steel & SS ½" through 6"
**Furnaces:** Petro-Chem, ½, ¾ mil. BTU-HR.

### HEAT EXCHANGERS

**Braun 3,360 sq. ft., steel, new**
Steel Tube: 1000, 900, 650, 500, 300, 200, sq. ft.
Adm. Tube: 2250, 2200, 1300, 900, 740, 625, 300 sq. ft.
S.S. Tube: 1228, 947, 570, 536, 380, 315, 250, 157 sq. ft.
4-6% Chr. Tube: 1000, 500 sq. ft.
Fin Tube: 73, 21, 11 sq. ft.

### PUMPS

**Hot-Oil:** 324 gpm @ 4600'; 735 gpm @ 3100'; 400 gpm @ 2000'; 1270 gpm @ 408'.
**Water:** 10,500 gpm @ 135'

### COMPRESSORS

**Worth.:** LTC-6, Gas Engine, 800 hp.
**Penna.:** 100 CFM @ 500#; 385 CFM @ 160#

**PARTIAL LIST ONLY—FOR DETAILED CIRCULAR**

**WIRE! PHONE! WRITE!**

**BRILL EQUIPMENT COMPANY**
**4101 San Jacinto St., Houston 4, Texas, JA 6-1351**
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FOR SALE EQUIPMENT

## —LIQUIDATIONS—

### TIDEWATER OIL CO.
### DRUMRIGHT, OKLA.

**FURNACES - BLOWERS - REACTORS - KILN - TOWERS - FINES SEPARATORS - ELUTRIATORS - HEAT EXCHANGERS - REBOILERS - PUMPS - COMPRESSORS - RECEIVERS - BINS & HOPPERS, ETC., FROM HOUDRIFLOW CAT CRACKER.**

### Other Equipment & Supplies

**TOWERS—PROPANE GAS**—dual 20,000 gal./day, also 6' x 30'; 5' x 58'
**AGITATORS**—20' x 28'4" Cone Bottom (2)
**SEPARATOR**—Hardinge Classifier, Oil/Water.
**REBOILERS**—750 to 993 Sq. Ft. 125 to 350 PSI
**CONDENSERS**—331 to 1500 Sq. Ft. Steel/Adm.
**TUBES—NEW**—Seamless 4-6% Chrome 4" to 6⅝", 5⅝" to 1" Steel, Admir. & Alum.
**PUMPS**—Centrifugal—Steam—Hot Oil.
**TANKS**—300 to 18,000 gal.—500 to 80,000 Bbl. 6,500 gal. PROPANE—10,000 Bbl. **HORTONSPHERE.**
Shop Equipment—Dyes & Chemicals—Hoist & Cranes—Automatic Telephone Equipment, etc.

### D-X SUNRAY OIL CO.
### ALLEN, OKLA.

**REACTORS**—6' x 42' 345 PSI @ 850° F.
**REBOILER**—318 Sq. Ft. 325 @ 350° F.
**PRESSURE VESSELS**—10' x 15'—4' x 5'—3' x 7'—2' x 6'—18" x 22'—12" x 18'
**CONDENSERS**—80 to 480 Sq. Ft. Steel/Admir.
**EXCHANGERS G FIN**—100 Sq. Ft.
**NEW FURNACE TUBES**—Croloy 5—2⅝" to 4" OD.
**NEW BOILER TUBES**—SS 2⅜" to 4" OD.
**FURNACES**—Intermediate Light Skimming Vac.
**HOT OIL PUMPS**—Motor Driven & Duplex Steam
**CENTRIFUGAL PUMPS**—40 to 1,600 GPM 30' to 327' Hd.
**STEAM PUMPS**—Simplex 4½ x 2¾ x 4 to 12 x 6 x 12
**STEAM PUMPS**—Duplex 5¼ x 4¾ x 5 to 14 x 7¼ x 14
**COLUMNS**—6' x 82', 5' x 24', 4'6" x 28', 3' x 23'6".
Motors, Transformers, Generators, Stacks, Instruments, Buildings, Ice Makers, etc.

***For complete information and brochure write today.***

**HEAT & POWER CO., INC.**
REFINERY DIVISION

60 East 42nd St., New York, N. Y.
310 Thompson Bldg., Tulsa, Okla.
P. O. Box 587, Drumright, Okla.
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CABOT PUMPING UNIT, Witte engine, 2900' 5½" casing, rods, pump, 3—220 barrel tanks, complete well equipment, located Sabetha, Kansas. Telephone DIamond 3-8292, Tulsa, Okla.

GAS METERS FOR SALE: Westcott and Foxboro Orifice Meters and Controllers. George Milner, Box 124, Okmulgee, Oklahoma.

COMPLETE SECOND HAND pipe shop, office equipment, buildings and stock, truck and trailer. Cutsinger Pipe & Tool Company, Perry, Oklahoma.

HELP WANTED

TRANSLATORS. Proven ability to translate technical material into fluent English essential. Attractive full time or free-lance arrangement. All languages of interest, particularly Russian. Send resume to A•T•S, Inc., Drawer 271, East Orange, New Jersey.

WANTED, a combination landman-attorney by Oklahoma City Contractor-Producer, preferably an individual with 3 to 5 years broad oil industry experience, graduate of accredited law school, trained in leasing, curative work, titles, unitization, farmouts, etc., capable also of being part time contact man to obtain drilling work and handling related drilling and production details. Excellent opportunity for top flight applicant. In confidence, Photo and all data to Box K-661, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY ENGINEER

Interesting (limited time abroad) consulting assignment available to qualified refinery engineer. Will assist with development of a feasibility study.

Box K-655, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

TRANSLATORS. Proven ability to translate technical material into fluent English essential. Attractive full time or free-lance arrangement. All languages of interest, particularly Russian. Send resumé to A.T.S., Inc., Drawer 271, East Orange, New Jersey.

PROCESS ENGINEER

Graduate chemical engineer with experience in gasoline plant process work, wanted for process and project work on gasoline plants, gas treating, and dehydration plants. Dresser Engineering Co., Masonic Bldg., Tulsa, Oklahoma.

MECHANICAL ENGINEER. Immediate opening for engineer with four or more years refinery experience in piping, structural, pump design and maintenance. Send detailed resume of background, experience, and salary requirements together with any information that may be of help in evaluating your application. Refinery Manager, P. O. Box 338, Scott City, Kansas.

## Refinery Process Engineer

Established Independent Oil Company has immediate opening for a graduate Process Engineer with several years refinery operating and process engineering background. Excellent opportunity. Send personal history, education, employment records and salary expected, Rocky Mountain Area. Write:

**Box K-649,**
**The Oil and Gas Journal,**
**Tulsa, Oklahoma.**

## PIPELINE

## Economics and Cost Analyst

Position available in Pipeline Department for Economics and Transportation Cost Analyst. Experience required, preferably with pipeline company. Salary commensurate with experience and ability. All replies confidential. Submit detailed resume to:

***Employee Relations Department,***

**GULF OIL CORPORATION**

**P. O. Box 1166** **Pittsburgh 30, Pa.**

HELP WANTED

FOREIGN EMPLOYMENT. List oil companies, drilling contractors, seismograph contractors, showing where apply foreign jobs, $5.00 cash. OIML Co., Box 2603, Tulsa, Okla.

SITUATION WANTED

PETROLEUM ENGINEER, 42, wife and child. 10 years experience with major equipment, drilling, completions, workovers, production, flooding, presently supervisor. Foreign considered. Box K-651, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED GEOLOGIST (45) seeks more responsible position. Box K-645, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY MANAGER or co-ordinator; experienced modern process operations, economics, costs, administration. Proven supervisor. Degree. Box K-665, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, married, 36, 4½ years subsurface experience Rocky Mountains, 1½ years South America. Locate anywhere in the United States. Box K-666, The Oil and Gas Journal, Tulsa, Oklahoma.

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FOREIGN JOB—Rotary Driller and tool pusher—20 years experience. References on request. Phone MOhawk 5-2357, Box 16, Wynnewood, Oklahoma.

GEOPHYSICIST with guts, ability, and determination plus twelve years diversified experience. Desires challenging position. Box K-667, The Oil and Gas Journal, Tulsa, Oklahoma.

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## NEW PLANT

Complete manufacturing facilities for
**ASME code-pressure vessels**
**Welded & Large O.D. Pipe**
Also
Licensed to Manufacture
**Medearis Mudmixers**
**Medearis Shale Shakers**
**Yard Can Handle Six Rigs.**

**PORT HOUSTON MFG. CORP.**
**Galena Park, Texas (Houston)**
**2405 Ave. K** **Phone OR 4-7691**
**W. L. LEGRO, President**

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## NORTHERN CONSOLIDATED AIRLINES, INC.

***Serving***

## WESTERN CANADA

Including the Kuskokwim, Yukon and Bering Sea areas.

Box 6133, International Airport
ANCHORAGE • ALASKA

LEASE AND DRILLING BLOCKS

## DRILLING BLOCKS WANTED

Have funds for drilling 12 to 15 shallow wells in as many different areas in northeast Oklahoma during the next 6 to 8 months. Can develop leases found productive over a short period of time. Definitely not interested in rank wildcats or water floods. Like Osage, Washington, Tulsa, Nowata, Pawnee, Creek, Muskogee and Wagoner counties. Am 1100 miles from Tulsa and will welcome correspondence and offerings from contractors, geologists and well rated brokers. Have had years of experience in the oil business in Oklahoma. Offerings must be on a common sense basis.

**BOX K-668,**
**THE OIL AND GAS JOURNAL,**
**TULSA, OKLAHOMA.**

EAST TEXAS LEASES ahead of Drilling between New Oil Strikes. $7 acre up. Showing Profits and Stands Investigation. References. E. M. ADAMS, Marshall, Texas.

APPROXIMATELY 820 acre commercial oil and gas lease located in Winkler County, Texas, Section 9 and part of 16, Blk. 27, P.S.L. for sale at $17.50 acre, over 4 years to run on new 5 year lease, no nearby dry holes. Contact Miss Hughes, Room 201, 2929 Cedar Springs Road, Dallas, Texas, LA 1-9994.

PRODUCING COMPANY would like to purchase good producing leases and royalties having some undeveloped locations. Any submitted must be accompanied with complete information and price. Box K-647, The Oil and Gas Journal, Tulsa, Oklahoma.

ALASKA: May I assist you file for your lease block? Your total costs 50c per acre. Lloyd E. Honsinger, 1702-J Twining Avenue, Anchorage, Alaska.

HAVE 3400 ACRE—solid block—10 year commercial leases Collingsworth Co. Texas—Drilling very active—This is only available block in County. Box K-654, The Oil and Gas Journal, Tulsa, Oklahoma.

I OFFER non-production royalties in Blanco County, Texas. 1/64th interest. 7,498 acres. Also have 5,120 acres in Terrell Co. 1/64th interest. Write for full details. John Stouppas, P. O. Box 1242, Columbus, Ohio.

## PETROLEUM AND NATURAL GAS

We offer for development approximately 10,000 acres potential oil and gas leases in the Flathead area of British Columbia, reached by a good road from Columbia Falls, Montana, to the border; access roads from the border pass through the leases which are surrounded by permits held by large oil companies. Maps and further information to interested parties upon request.

**AMALGAMATED OIL CO. (1950) LTD.**
529 Standard Building,
510 West Hastings St.,
VANCOUVER 2, B. C.

## DUE TO TODAY'S LOW ALLOWABLES

**If you have leases to develop WHERE RESERVES ARE GOOD we are interested and want to drill. Principals only: References exchanged.**

Write full particulars to

**Box K-663,**
**THE OIL AND GAS JOURNAL,**
**TULSA, OKLAHOMA.**

## OIL OPERATORS

Four Corners Area—Arizona. Ten thousand acres, now Government leases (will subdivide) on U.S.G.S. Geology, $3 per acre, 3% over-riding royalty. Unsurpassed opportunity—forced to sell. Send for free geological maps or call collect
**AComa 2-1363, C. E. Stout,**
**Colorado Building, Denver 2, Colorado.**

### BUSINESS OPPORTUNITIES

SELL YOUR GAS—Turn waste into cash. We will furnish compressors, gathering systems and know-how if you have marketable gas, gasoline plant. Knight Mfg. Co., Box 3265, Tulsa, TEmple 8-3304.

DRILLING 1500 FT. deep offset to Tensleep sand (long life) in Washaki County, Wyoming. Need financial help. Box K-650, The Oil and Gas Journal, Tulsa, Oklahoma.

## FOR SALE

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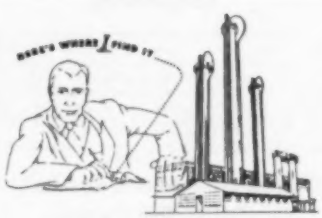


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## PIPELINE CONSTRUCTION

(Continued from page 132)

- **Cuban Gas Transmission Co.**

  Project: 650-mile pipeline from Campeche area of Mexico across Yucatan and on the ocean floor to Havana, Cuba; 150 miles would be submarine.
  Status: Being studied by Ebasco Services.

- **Ferngas**

  Project: 45 miles of 12-in. from Semmering to Donawitz, Austria.
  Status: Planned.
  Contractor: **Mannesmann,** a German steel and construction firm.
  Completion: 1958.

- **Gaz de France**

  Project: 550 miles of 16 to 24-in. from Lacq field, southwestern France, to Paris, plus a 10-in. terminal to Nantes and 12 to 16-in. laterals to Lyons, making a 1,000-mile system.
  Status: Under way.
  Contractor: French contractors.
  Completion: First stage in 1958; complete system in 1960.

- **NIOGAS**

  Project: 160 miles of 6, 8, 10, and 12-in. from Fischamend field to Vienna and other Austrian cities.
  Status: Under way.
  Contractor: **Williams Brothers Co. and Costain-John Brown, Ltd.**
  Completion: Fall 1958.

- **North Thames Gas Board**

  Project: Will extend its Shellhaven-to-Romford line to Coryton then to Canvey Island.
  Status: Planned.
  Completion: Summer 1958.

- **Petroleos Mexicanos.**

  Project: 130 miles of 22-in. to parallel a 14-in. line from Reynosa to Monterrey.

- **Sui Gas Transmission Co.**

  Project: 310 miles of 16-in. from Sui gas field to Moultan, Pakistan.
  Status: Under way; to be extended later to Lahore with branches at Kot Addu, Jhang, Magiana, and Montgomery.
  Contractors: **Pakistan Constructors,** a joint company of **Morrison-Knudsen** of Boise, Idaho, and **William Press, Ltd.,** of London.
  Project: 145-mile line from Sylhet to Dacca, East Pakistan.
  Status: Under consideration. If approved construction could start December 1958.

- **Technical Office of Hydrocarbon, Ministry of Mines and Petroleum, Government of Venezuela.**

  Project: 63 miles of 20-in. westward from Caracas to Valencia and Puerto Cabello.
  Status: Under way.
  Contractor: **Petrogas, S. A.**
  Completion: July 1958.

- **Union of Soviet Socialist Republic.**

  Project: 808 miles of 26-in. from Stavropol in the Northern Caucasus to Moscow, to serve Voroshilovgrad, Voronezh, Tula, Yelets, and Serpukhov.

- **Yacimientos Petrolifferos Fiscales (Argentina)**

  Project: 1,015 miles of 24-in. from Camp Duran to Buenos Aires.
  Status: Planned.
  Contractor: **TIPSA** (Fish Engineering Corp., Fish Northwest Constructors, Inc., Clark Brothers, North American Utility Construction International Co.)
  Completion: Mid-1960.

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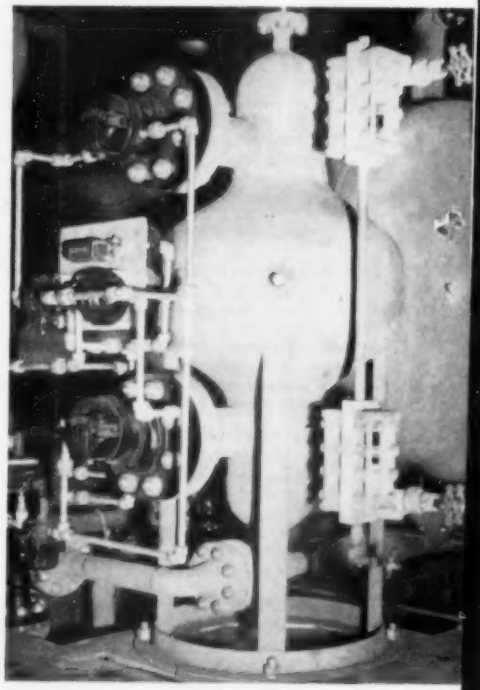

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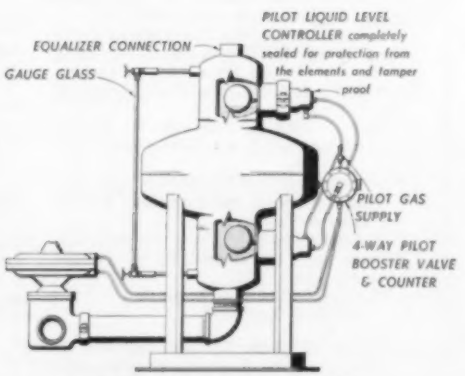
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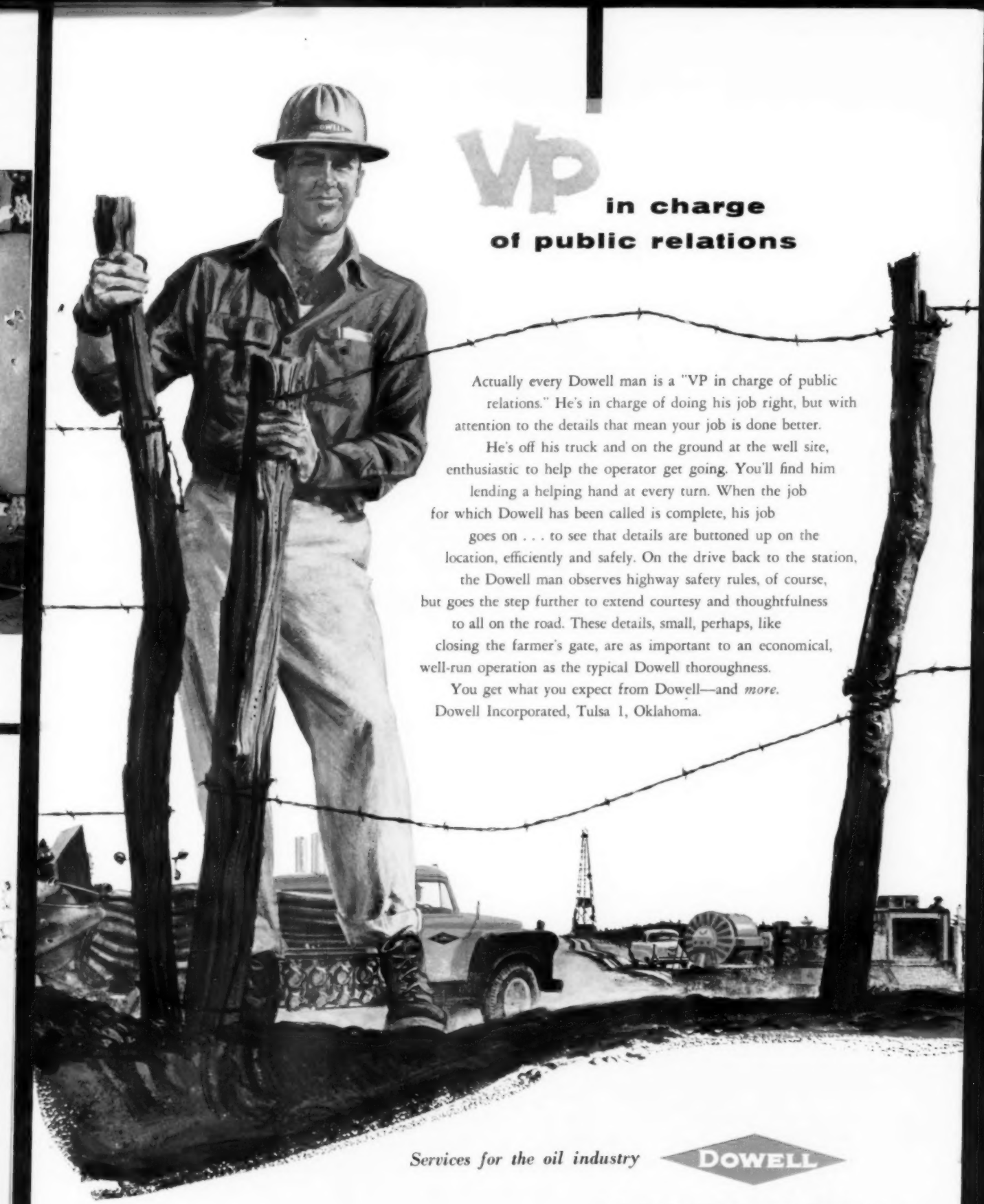

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